

FLIGHT

&
The AIRCRAFT
ENGINEER.

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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Index and Title Page for Vol. IX.

The 8-page Index for Vol. IX of "FLIGHT" (January to December, 1917) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C.2. Price 8d. per copy, post free.

EDITORIAL COMMENT.

"Newspapers are an essential part of our war organisation."—
(Sir Auckland Geddes, Minister of National Service.)



OW that official despatches and the messages of the correspondents relating to the great battle in the West are becoming more connected than it was possible for them to be while the struggle was raging with its greatest intensity, it is possible to gather with some accuracy an impression of the really magnificent contribution of the Royal Air Force to the damming of the German flood. The work of the British airmen covered many spheres of activity, which may well be divided into two classes. First the upper air had to be cleared of the enemy's scouting machines and his artillery observation machines, and his fighting aircraft had to be chased away in order that our own reconnaissance machines and "spotters" might

continue their tasks free from interference. This first phase of activity is the one which may be said to include all the legitimate tasks of aircraft as they have hitherto been understood, though, as will be seen, the functions of the airman in war have quite recently undergone a considerable extension and he has in fact become a general utility soldier who is likely to be called upon to do the work of all three arms of the "ground" service, very often at one and the same time. He is doing the work of reconnaissance, which before he became a potent factor in war, was the work of the cavalry. He flies low over the enemy's advancing waves of infantry, pouring machine-gun bullets into their ranks and displacing the defending infantry and machine-gun sections. Then, when the enemy is massing at his concentration points or is bringing up his columns preparatory to their deployment the airman is called upon to carry out the functions of the artillery by dropping heavy bombs where they are likely to cause the greatest loss and inconvenience to his movements. Truly, the Royal Air Force might do worse than plagiarise the motto of the Gunners and adopt the word "Ubique" as their own!

Between March 21st and April 3rd our airmen are said to have fired 1,139,525 rounds of small-arm ammunition from their machine-guns into German troops and transport columns. That estimate is, we believe, very well inside the mark, since later official figures record that in two days over 700,000 rounds were expended by low-flying machines. Neither figure, however, is likely to stagger the experienced machine-gunner by its magnitude when the number of guns in action is taken into account. In fact, it sounds rather moderate until we remember that the targets offered to low-flying aeroplanes are fleeting and it is only possible to fire short bursts at them, though as the targets, when they do offer themselves, are fairly open these short bursts achieve the maximum effect.

Coming to the bombing work of the R.A.F. during the later phases of the battle, no fewer than 303½ tons of bombs were dropped on German billets, railheads, dumps, gun positions and concentrations of troops. Day bombing accounted for 179½ tons of bombs, while 151 tons were dropped by the night bombing squadrons. The greatest weight of bombs dropped on any one day was 28½ tons, while the heaviest night expenditure amounted to 31 tons. As to the

toll taken of enemy machines, no exact figures seem to be available, but so far as it is possible to get at the figures, our airmen appear to have destroyed or driven down some 270 enemy machines at a cost, in round figures, of 100 machines to ourselves. Some idea of the intensity of the air fighting may be gathered from the fact that during one day's fighting alone, a single brigade of the R.A.F. destroyed 22 enemy machines and drove down out of control another seven.

Meagre as these statistics are, they afford some small opportunity of assessing at its true value the really wonderful work that is now being performed by the aerial arm in the decisive struggle of the West. How really great a part the R.A.F. has had in assisting to hold up the German rush for the sea we shall probably never know until the official histories of the war are written—even if we are ever told it. Certain it is, however, that without the self-sacrificing gallantry of the men who fly, the position of the battle-front as it is to-day would be more disquieting than it is. More than that it is impossible to say until fuller information is available.

Output Must be Accelerated.

Certain figures relative to the comparative strength in the air of the Germans and ourselves have recently been disclosed under the seal of confidences and these figures convey the lesson that if the war is to be won this year we must still further accelerate the output of aircraft. Naturally, we cannot for the best of reasons say what the proportionate number of British machines employed at the front actually is at the moment, but it is permissible to state that we must have not only more of them, but proportionally more—which is not quite the same thing—if we are to bear our fair share towards attaining victory in the air.

So far as the information at our disposal enables us to judge, the principal acceleration is needed in engine production. We believe it to be the fact that the actual construction of machines has overtaken and passed our present capacity for turning out engines, and it is in this direction that we shall have to carry out an immediate programme of speeding up. Although the communiqués from the front would lead us to believe that our airmen have established a definite superiority over the enemy's air service, it would seem that that superiority has been achieved more as the result of personal ascendancy than by reason of any great preponderance in the numbers of aircraft available for their use. As a matter of fact, it is really doubtful if we have any marked superiority in numbers. The Germans have strained every nerve during the past winter to hasten production, and they are now able to turn out machines at a far faster rate than has been the case at any previous period of the war, and that in spite of their undoubted shortage of many of the essential materials. Indeed, we gather from authoritative sources that the German capacity for output has been increased to such an extent that machines are coming through much faster than pilots can be trained to fly them and that the present inferiority of the enemy is due as much to that cause as to any other. In all probability the reason for this is that the production of machines has exceeded the estimate by such a substantial margin as to have left standing the arrangements for the advance training of personnel. At any rate, the course of wisdom is to assume that

this is so and to base our own arrangements for future production on that assumption. If the theory is correct, as we believe, we may be very certain that so practical a people as the Germans have shown themselves to be have already taken the necessary steps to increase their capacity for the training of pilots and it would thus follow that unless we in our turn exert our maximum effort it is quite on the cards that we may have another surprise sprung upon us before the end of the present campaigning season. The Air Ministry is, we believe, quite alive to the danger and is doing all in its power to speed up engine production, but if we are to do all that is essential it is necessary that everyone concerned should realise the position and put on one side every question of personal interest for the time being in order to entirely devote himself to the task of securing victory in the air. There must be no question of strikes or stoppages of work in the aero-engine factories of the country at this the most critical period of the war. The times are more than critical—they are decisive. The whole future of liberty and civilisation hangs upon the issues of the next three months—possibly less than that—and until that future is decided in the only way it can ultimately be shaped every other interest, no matter what or on whose side right or wrong may eventually be found to lie, must remain for future settlement. These matters can always be talked over and adjusted after we have completed the great essential task of beating the Hun.

The Future of the Industry.

In the Trade Supplement of the *Times* for April Mr. Bernard Isaac has an article on the "Future of Aircraft Industry," in which there is some amount of food for thought. We do not propose to follow the writer through all his arguments, since he does not advance much that is new, or that has not been said and discussed among those whose business identifies them with the production of aircraft, but there are one or two notes of warning sounded which it will be well if those interested will take to heart. Naturally, Mr. Isaac has an abiding faith in the ultimate success of the industry, but he is under no delusion as to the manner in which those who intend to stay in the industry will have to fight for their business. As he very truly emphasises, the industry of producing and selling aircraft will have to be conducted along the most serious commercial lines. Not only will factories have to be organised to produce up to their maximum capacity, but a real sales organisation will have to be established and it is here that the principal difficulties will be encountered. So far as concerns quantity production, we may take it that all our aircraft factories are reasonably well equipped and organised to get within measurable distance of the maximum output attainable. The stress of production for use in the war has seen to that, and doubtless the war organisation will, with few alterations, easily adapt itself to the requirements of peacetime business. But the growth of manufacturing organisation has not been accompanied by a similar growth in selling organisation. As a matter of fact, it would perhaps not be very far wide of the mark to say that sales organisation in aeroplane concerns in this country is non-existent. Of course, there does exist a nucleus of a sales organisation, inasmuch as it is necessary that there should be something of the sort to handle the commercial end of the business even when sales are not a matter of competition

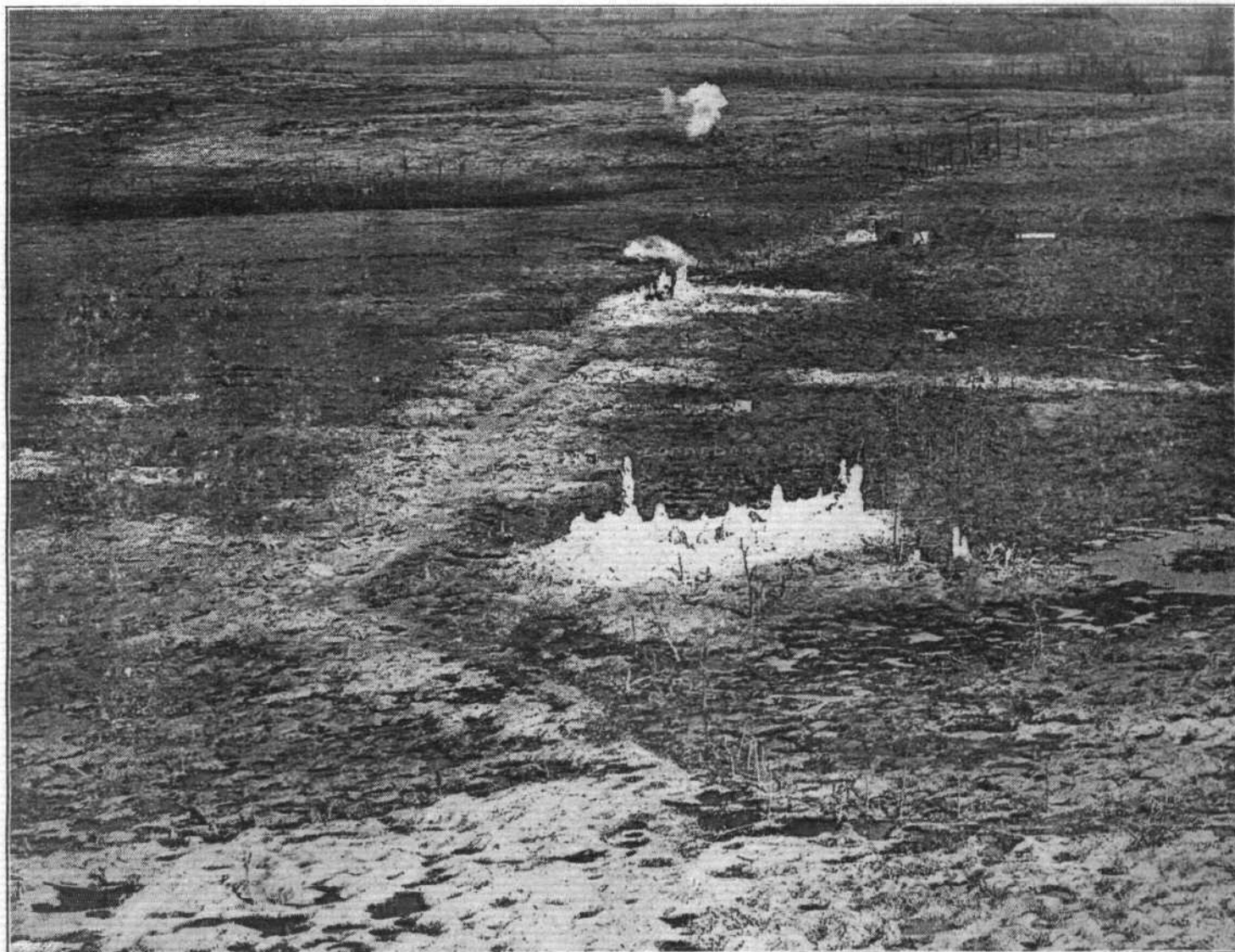
and when orders are not so much a matter of anxiety in the getting as in the execution. During the present strenuous times it is easy enough for any concern which can show its capacity to turn out what is required to obtain orders up to—and even beyond—its facilities for production. Now it is simply a question of executing the orders that come automatically. After the war, every order that comes along will only come as the result of a properly built up and efficiently worked sales organisation, and those firms who have not prepared a well-organised selling policy will find themselves at a considerable disadvantage compared with their more far-seeing competitors.

Another useful point raised by the writer is that of the immediate prospects of business after the war. There is rather a tendency, we think, to imagine that matters will remain pretty much as they are now; that there will still be a heavy demand for aircraft from the Governments of the world—particularly the present neutrals, who will proceed to set their aerial houses in order as soon as peace between the two great belligerent groups releases sufficient facilities—and that there will be something of a "boom" in orders for machines for private and commercial purposes. Mr. Isaac, on the contrary, believes—and we agree with him—that there will be little demand for the first twelve months after

the war for aircraft for private, commercial or military purposes. If that should be so, it will not be an unmixed curse, inasmuch as it will afford a much-needed breathing space during which a great deal of necessary reorganisation can be carried out methodically and without the hindrances inseparable from the following up of an active forward commercial policy. There is no need to elaborate the argument, but we do think Mr. Isaac has done the industry a good service by pointing to this probable temporary slump. If the industry as a whole recognises that such a short period of stagnation is almost inevitable and makes up its mind that it will only be an interval before settling down to permanent serious commercialism, a great deal of disappointment will be saved and the period will be turned to good account.

• • •

Commercial Potentialities of Flight. In the same issue of the Trade Supplement Captain A. J. Swinton writes of the commercial potentialities of flight, of which he takes a rosy view. Like Mr. Isaac in dealing with his chosen subject he does not tell us anything that is new, but some of the statistical tables are produced in interesting form. For example, he gives us a comparison of the times at present occupied in single and double journeys to and from London and the most important business



Zonnebeke Church, as it is to-day, and the surrounding scene of desolation and destruction.

British Official.

centres of the world, and compares them with the probable time-table of the future, when aerial transport has become a normally established factor in world travel. It has been done before, notably by Lord Montagu and Mr. Holt Thomas, but not quite in the same form. Later in the article Captain Swinton gives us tables of the comparative costs of travel and transport by train, motor-car, steamer, motor-omnibus and aeroplane over short journeys and long which are interesting, though they appear to be based more on assumption than on ascertained facts. For example, he assumes the working day of each type of transport at 24 hours, which obviously must lead to misunderstanding when comparing one with the other. Then, he assumes the daily mileage of the flying machine as 2,400—a speed of 100 miles an hour twice round the clock. The motor-car is credited with a daily mileage of 480, or 20 miles an hour for every 24 hours; while the train is given a days' work of 960 miles, or at the rate of 40 miles an hour. It scarcely needs pointing out that these figures are much more idealistic than real. Not to put too fine a point upon it, they are impossible, and therefore the comparisons that follow in relation to steamer capacity are valueless. Captain Swinton bases his comparisons on a mail steamer mileage of 360 per diem, and a cargo steamer's work of 240 miles per day, both of which are sufficiently near the average to be taken as a good basis. But the whole scheme of comparative cost of passenger and cargo mileage falls to the ground because the other methods of traction are credited with far greater capacity for travel than they actually possess. However, in spite of these drawbacks, which tend to vitiate the whole of the argument, Captain Swinton's article is well worth perusal by the student of commercial aviation and its possibilities for peaceful development.

In regard to most of the rest of the "space-filling" matter which appears in this special supplement, perhaps the less said the better.

More Aerodromes.

Lord Rothermere has addressed the following appeal to the aerodrome workers throughout the country:—

"Our splendid airmen during the present battle have accounted for 339 of the enemy's aeroplanes, and have killed very many of the enemy by bombs and by machine-gun fire. They are working night and day for their country.

On their behalf I ask you to do everything you can to hasten construction work now being undertaken at your aerodrome.

Each one of you can help. The more aerodromes we have, the more pilots we can train and the more machines we can have in the air against the enemy. Aerodrome construction



SEPARATION ALLOWANCES IN R.A.F.

AN Army Council Instruction, dated April 3rd, 1918, states that from April 1st, 1918, the payment of separation allowance for the Royal Air Force will devolve on the Central Pay Officer, Royal Air Force, Woking, except that multiple claims in which soldiers and airmen are jointly concerned will continue to be dealt with under Appendix X of the Separation Allowance Regulations, as at present, and paid by the Command Paymaster, London District, 168, Regent Street, W. 1.

2. The separation allowances of wives and dependants of men of the Air Force will be at Army rates and subject generally to the conditions of the Separation Allowance Regulations, and the various Army Forms herein prescribed will continue to be used for the present. The procedure for dealing with "multiple" claims will therefore be exactly the same as if the Central Pay Officer, Royal Air Force, were an Army Paymaster.

3. Pending reprint of A.F.O. 1839, the words "or airmen" should be inserted after "soldiers" and "or Royal Air Force" after "Army" in question 8, before the form is despatched to the Pension Officer.

work is just as necessary as the work of the airman. Without your help he can do nothing, and without his matchless courage and endurance it will be impossible for the armies in the field to withstand the constantly increasing pressure of the foe.

According to newspaper reports, the appeal has been well received in most centres and the workers generally agree that now is the time for everyone to put his back into the construction of these new training grounds for our airmen. The *Daily Mail*, however, records a conversation with an engineer who is stated to have said:—

"It is all a question of trade union rules. If the unions would relax a little and allow certain work to be done at piece rates instead of time rates, we should get along at a great rate. At present the bricklayer cannot do more because his labourer is not allowed to bring him more than a certain number of bricks per hour. Even at time rates the wages they are getting should induce the men to work hard."

The men whose work is so necessary for the success of our air fighting men are bricklayers, carpenters and navvies. Many of them are young men exempted on account of skill from Army service.

We are certainly not going to be so ill-advised as to condemn a whole class on the faith of an *ex parte* statement of the kind quoted above, and we therefore decline to pass any sort of judgment on the specific case alleged against the bricklayer and his labourer. But there is not the slightest doubt that we are, generally, very far from having got rid of the malign effects of trade union restriction of labour. It is significant that now, when we are at the most vital period of the war in which we are fighting for our very existence, we should have to listen to explanations of the kind we have quoted above which, if they mean anything at all, mean that certain sections of labour are, with their eyes open, letting down our men at the front rather than break away from their trade union restrictions on output of work. It is a sorry reflection that well-paid labour, working under conditions made safe for it by the sacrifices of the ill-paid men in the trenches, should persist in increasing the danger of our soldiers and in lengthening the time they must spend overseas under every circumstance of danger and difficulty by its adherence to rules which may be all very well in times of piping peace but which should have been thrown overboard three and a half years ago. Really, it is so difficult to write with patience on such a subject that we feel we must leave it. There is just one comforting reflection, which is that the men from the trenches will pass their own judgment, in their own way, on the slackers when the time comes.



AIR MINISTER TO AERODROME WORKERS.

THE following message has been addressed by Lord Rothermere to the aerodrome workers of the United Kingdom:—

"Our splendid airmen during the present battle have accounted for 339 of the enemy's aeroplanes, and have killed very many of the enemy by bombs and by machine-gun fire. They are working night and day for their country.

"On their behalf I ask you to do everything you can to hasten construction work now being undertaken at your aerodrome.

"Each one of you can help. The more aerodromes we have, the more pilots we can train and the more machines we can have in the air against the enemy. Aerodrome construction work is just as necessary as the work of the airman. Without your help he can do nothing, and without his matchless courage and endurance it will be impossible for the armies in the field to withstand the constantly increasing pressure of the foe.

"ROTHERMERE,
"Secretary of State for the Royal Air Force."

AN ALBATROS FIGHTING BIPLANE.

(Concluded from page 370.)

THE attachment of the upper wing spars to the *cabane* is somewhat similar to that of the lower spars, inasmuch as a pin fitted with a spiral spring secures the spar to the *cabane*. Here, however, the similarity ceases. Instead of the spar box into which fits the lug on the side of the body, the upper spars are provided with a forked lug, probably a forging machined to shape, of the form shown in Fig. 28. The lug of the opposite spar is of the same shape, but is, of course, reversed, so that when the two spars

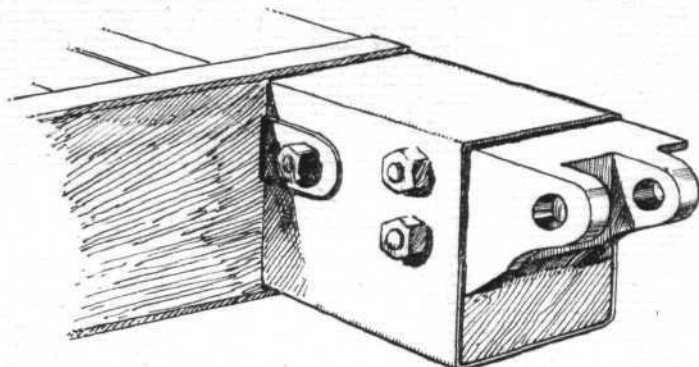


Fig. 28.—Sketch showing lugs on root of upper main wing spars of the Albatros.

meet against the top of the *cabane*, their respective lugs are staggered in relation to one another. From the shape and attachment of the lugs it will be seen that as they are staggered on the spar and in relation to one another, the spars will, when in place, come in line with one another. On one of the outer faces of the forked lug a piece is left solid, and is shaped to receive the rounded end of the opposite lug. This has probably been done in order to reduce the shearing stress on the pin securing the lugs to the *cabane*.

In a previous issue reference was made to the lateral control of the Albatros, the chief feature of which was, it may be remembered, that the wing-flap crank-lever was horizontal, as in so many other German machines. The control cables for the wing-flaps are, therefore, arranged in a somewhat unusual way. The details of this arrangement are shown clearly in Fig. 30. From the front and rear half of

the wing-flap crank-lever cables pass down to pulleys enclosed in a casing mounted on the rear face of the back spar of the lower plane. After passing over these pulleys the control cables pass *through* the rear spar to another pair of pulleys mounted on the tubular compression strut, and hence to the controls in the body. A light framework surrounds the pulleys as shown in the sketch, and forms the support for the hinged inspection doors by means of which the condition of the pulleys and control cables may be examined. The tension of the wing-flap control cables is regulated by means of turnbuckles inside the lower wing. These turnbuckles are situated close to the side of the body, and are rendered accessible by hinged aluminium inspection doors on the lower surface of the bottom wing. In order to prevent the turnbuckles from catching against the edges of the wing ribs, cables and turnbuckles are surrounded by a tube of aluminium, having on its under side an opening with edges flanged outwards to reduce the danger of a slack control cable allowing the turnbuckle to touch the edges of the opening in the tube.

As in the majority of modern tractor aeroplanes, the undercarriage of the Albatros is of the Vee type, and is built of stream-line steel tubing throughout. The general arrangement of the undercarriage is shown in 1, Fig. 29, from which it will be seen that only the front pair of undercarriage struts are diagonally braced by cables. Reference has already been made to the claw brake, and to the manner in which it is operated from the pilot's cockpit. In the sketch its general arrangement will be evident. The front and rear struts of the undercarriage fit into split sockets at the top and bottom respectively, from which they may be withdrawn by undoing the bolts of the socket, thus facilitating replacement in case of damage due to a rough landing.

Front and rear strut sockets are attached to the body in a slightly different manner, as will be seen from the sketches of Fig. 29. In the case of the front strut sockets these are welded to a wide steel strip passing underneath the bottom of the body, thus tending to distribute the load over a greater area of the body. The details are shown in the general



Three-quarter front view of the Albatros biplane

arrangement sketch, and in 4, Fig 29. Just inside the strut socket the cup-shaped terminal for the diagonal bracing cables of the undercarriage is secured, while a short distance above the socket is situated the attachment for one of the main lift cables. This ball and socket joint, which is used

with slight variations on nearly all German machines, appears to be almost the only fitting that may be truly said to have been standardised by the Germans. It is made in a range of sizes, no doubt all made to some uniform standard, so as to render it applicable to a number of different types of machines. The

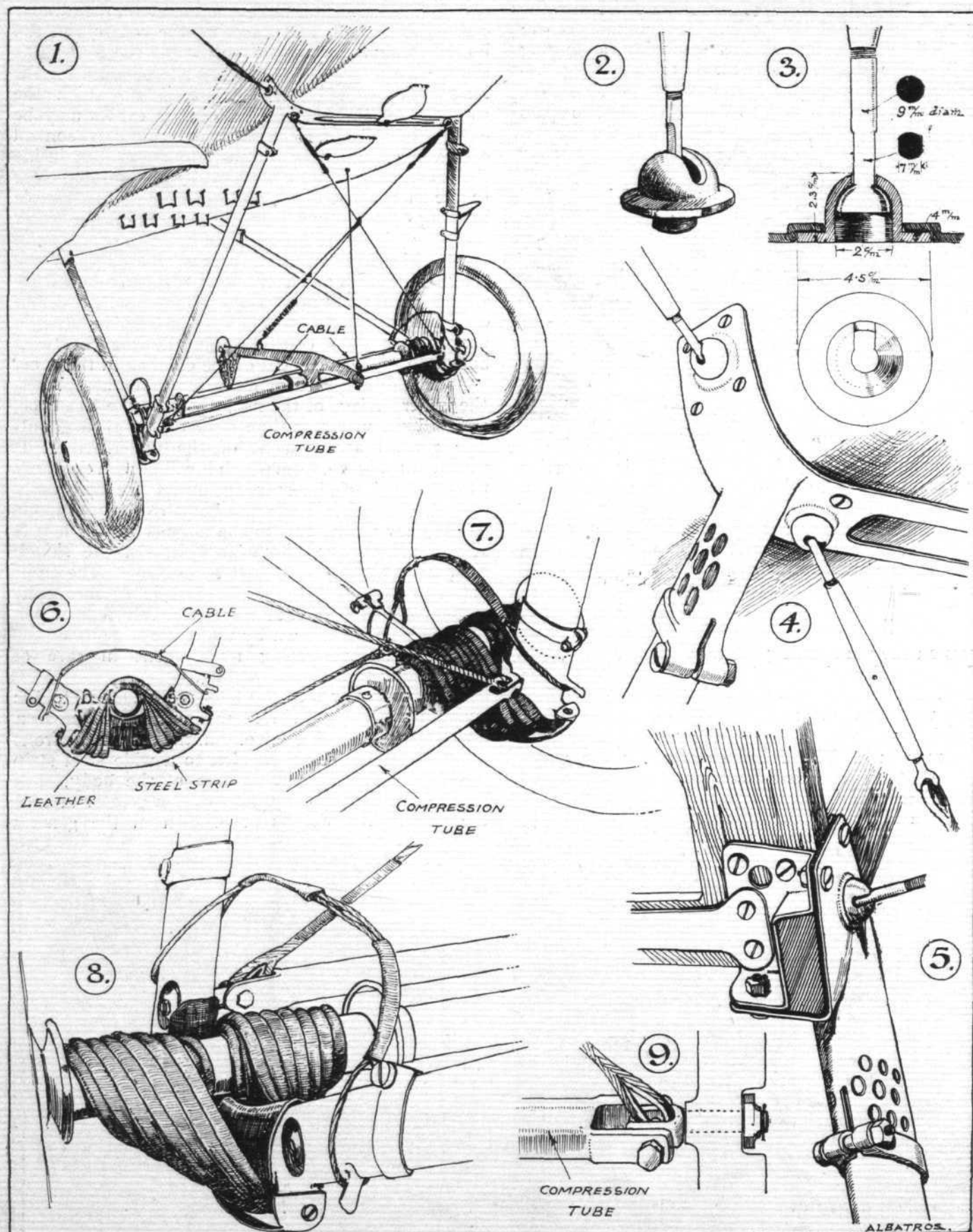


Fig. 29.—Some details of the undercarriage of the Albatros. 1. General arrangement of the undercarriage. 2 and 3. Detail of cable terminal. 4. Steel strip passing under body, to which is welded the front chassis strut socket. 5. Attachment of rear chassis strut to body. 6. Lower attachment of chassis struts and shock absorbers. 7, 8, and 9. Details of same.

details of the fitting are indicated in 2 and 3, Fig. 29. The base plate securing the hemispherical socket to the body or whichever part of the aeroplane the terminal happens to be attached to, is recessed, probably by stamping, and into this recess fits the flange of the socket. The socket itself is free to turn in the circular recess of the base plate, thus allowing the cable to accommodate itself to any angle desired. The end of the turnbuckle has two flats on its shank which prevent the strainer from turning. For purposes of adjustment the slot in the socket is enlarged at its inner end so as to allow the strainer to turn when in a position at right-angles to the base plate.

The attachment of the rear chassis strut to the body is shown in 5, Fig. 29. The base plate to which the strut socket is welded is of angle section, and is secured, *via* brackets as shown, to steel strips running across the body, and which take the tension of the lift cables. This arrangement is somewhat similar to that of the lower wing spar attachment, which we described in a recent issue.

The lower ends of the two Vees are formed by short lengths of bent tube of slightly larger dimensions than the struts themselves, for which they form sockets. The details will be evident from the sketches and hardly need any explanation. Running across the undercarriage parallel with the axle are: in front a compression tube, and behind a stranded cable.

A steel strip protects the rubber shock ab-

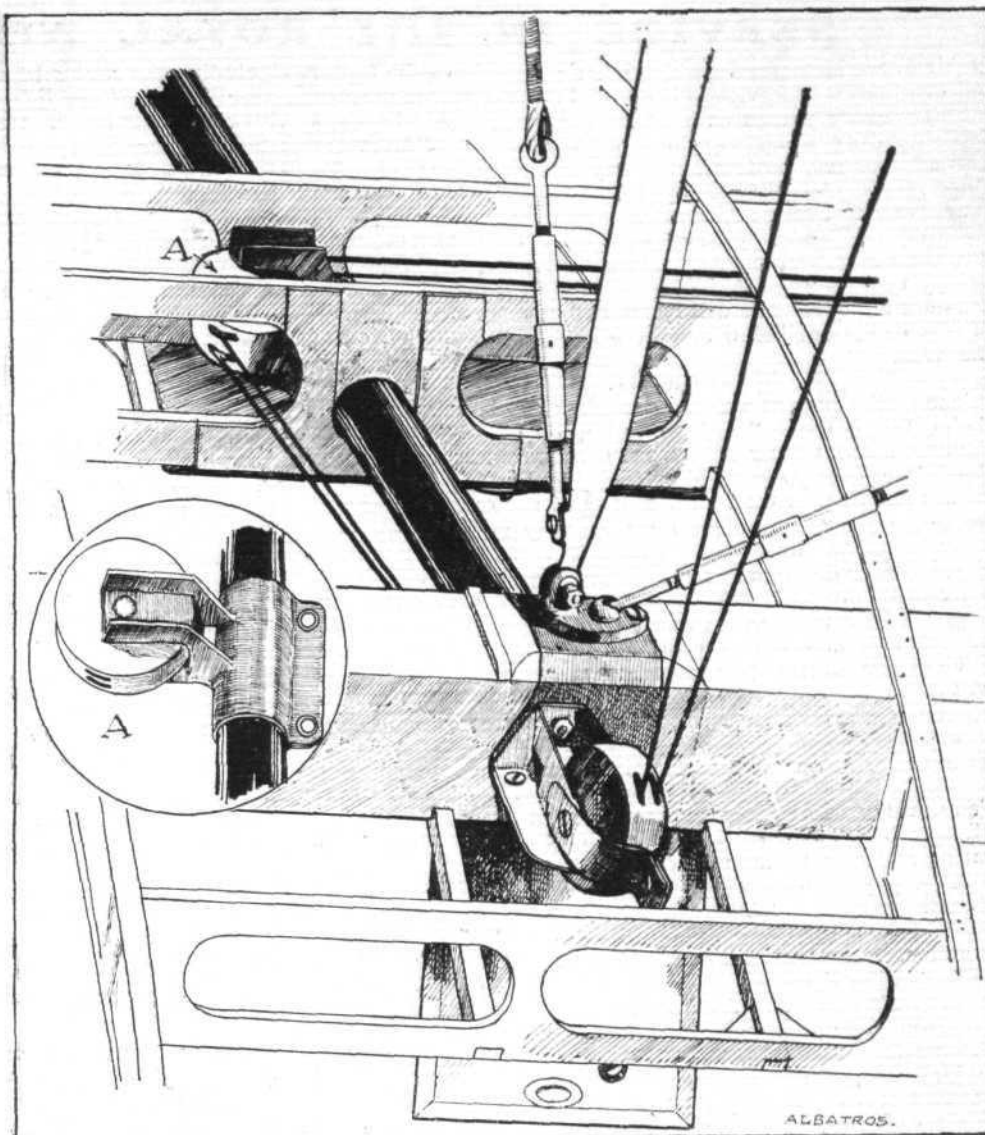


Fig. 30.—Arrangement of wing flap control cable pulleys in bottom wing of the Albatros. After passing over pulleys on rear spar, the control cables pass through the spar horizontally.

Back from Germany.

It was announced on April 2nd that the following officers who were prisoners in Germany have arrived in England after internment in Switzerland:—

2nd Lieut. W. R. C. Carmichael, High. L.I., attd. R.F.C.
 Capt. R. Corbett, Yeo., attd. R.F.C.
 Lieut. D. D. Drury, R.F.C.
 Lieut. F. G. McIntosh, R.F.C.
 Lieut. A. J. O'Byrne, R.F.C.
 2nd Lieut. F. G. Pinder, R.F.C.
 Lieut. H. B. Russell, R.F.C.
 2nd Lieut. J. Toogood, R.F.C.

R.A.F. Appointments.

It was announced on April 3rd that the Secretary of State for the Royal Air Force has appointed Mr. W. A. Bland, Director of Departmental Finance, War Office, to be Assistant Financial Secretary in the Air Ministry.

A Medal for the R.F.C.

It was announced in a supplement to the *London Gazette* on April 2nd that the King has been pleased to approve of the award of the Military Medal to the following:—

64937 2nd Air-Mech. H. Bair, R.F.C.

sorbers from contact with the ground, and a padding of leather is interposed between the axle and the bottom of the Vee. The upward travel of the wheel axle is limited by a short loop of cable, against which the axle comes to rest after travelling the permissible amount.

Queen Alexandra at Messrs. F. W. Berwick and Co.

It was announced in the *Court Circular* that Queen Alexandra, accompanied by the Princess Victoria, and attended by the Hon. Charlotte Knollys and Colonel Sir Arthur Davidson, visited the Munition Works of Messrs. F. W. Berwick and Co., Ltd., in the afternoon of April 4th. Her Majesty was received on arrival by Mr. F. W. Berwick, Managing Director; Mr. Alexander Keiller, Mr. James Greig and Mr. Lionel Goodricke, directors. Major C. S. Paulet, Ministry of Munitions, was also in attendance.

Aircraft Workers' Wages.

In regard to a recent claim made to the National Engineering Federation by the National Federation of General Workers, the Committee on Production has approved of the payment of 12½ per cent. to plain-time workers in federated establishments throughout the Kingdom who are wholly engaged in the manufacture of aircraft or aircraft parts.

Successful Italian Pilots.

At the ceremony of presenting medals to successful Italian aviators in Milan on March 25th, Signor Chiesa, the Aeronautical Commissioner, said that Italian aviators between October and March had brought down 176 enemy machines, while losing only 33 of their own. Among those who received Gold Medals were Major Baracca, with 30 victories, and Capt. Ruffo do Calabria, who has engaged in 52 fights.

SERVICE IN THE ROYAL AIR FORCE.

IN Air Force Memorandum No. 6, which sets forth the terms and conditions of service in the Royal Air Force it is pointed out that every person enlisted into the Royal Air Force is liable for duty afloat or ashore, at any station at Home or Abroad, and may be detailed to any branch of the Royal Air Force; i.e., Airship, Aeroplane, Seaplane, Kite Balloon Work, or any type of Aircraft if considered medically fit for such service; and may be called upon, if medically fit, to go into the air in Airships, Aeroplanes, Seaplanes, Kite Balloons, or any type of aircraft. The selection of a man for service does not imply that he will be trained as a pilot. The terms of service set out below are those in force for the period of the War.

Cadets.

The earliest age at which a candidate can be admitted to a Cadet Wing, Class "A" (Officers), or Class "B" (Non-Commissioned Officer Pilots or Observers), is 17½ years. Candidates over 30 years of age are not eligible. Candidates should not be over 6 ft. 1 in. in height, nor over 13 stone in weight, and their eyesight must be very good. Admission is by selection, subsequent to an interview, by a Royal Air Force Officer detailed for that duty, and after passing the prescribed medical examination. Civilian candidates are required to attest before admission. Full instructions will be issued to each selected candidate.

The initial service pay of cadets entering from civilian life will be 1s. 6d. a day. Those drawn from other services will continue to draw the pay of their permanent rank in their former service if more beneficial. They will be provided with uniform, quarters and rations, and while they are in receipt of these initial rates of pay, a special messing allowance of 1s. a day will be issuable on behalf of each cadet, unless already being paid as a sergeant, for each day on which a ration is drawn by his unit on his behalf.

After a period of initial training, cadets will be primarily classified as Class "A" (Flight Cadet) or "B" (Non-Commissioned Officer Cadet), according to merit, character, personality, education and aptitude for leadership. Cadets of Class "A" will be provided with uniform of officer's pattern to the value of £15. At any time during training, a cadet may, on the recommendation of his Commanding Officer, be transferred from Class "A" to Class "B" or vice versa; and if found unsuitable for any reason, may be reverted to his original service, employed in the Royal Air Force in some other capacity, or discharged and placed at the disposal of the Ministry of National Service.

Cadets on joining will be posted to a Cadet Wing or School for initial training, and will then pass in succession through Schools of Aeronautics and Armament. From the latter school, they will be posted to squadrons for instruction in flying. Class "A" Cadets being then graded as Flight Cadets and given service pay at 7s. 6d. a day, also 4s. a day flying pay, whilst actually under instruction. Class "B" Cadets will be graded as Sergeants (Non-Technical Branch) and given service pay at 3s. 3d. a day, also 1s. a day flying pay whilst actually under instruction. Flight Cadets will mess with the officers and others with the Sergeants. The special messing allowance will cease.

On passing Flying Graduations "A" and "B," Flight Cadets will be commissioned and paid as 2nd Lieutenants receiving 10s. a day service pay and 4s. a day flying pay, while the Sergeants (Non-Technical) will be transferred to the Technical Branch as Sergeant Mechanics receiving 6s. a day service pay, also 1s. a day flying pay. Flight Cadets, on being commissioned, will be credited with £35 towards the cost of completing their uniform and kit. Sergeant Mechanics will retain the full kit issued to them. On passing Flying Graduations "C," or if required to proceed overseas before such graduation is completed, pupils may be authorised to wear their "wings" and given full flying pay, officers at the rate of 8s. a day and Sergeants Mechanics at 4s. a day if Pilots and 2s. a day if Observers.

Thereafter, officers will be eligible for promotion, &c., within the Royal Air Force, which, in the Flying Branch itself, leads to

Lieutenant—12s. service pay, rising to 16s. a day, with 8s. a day flying pay whilst employed on duty which involves flying.

Captain—19s. service pay, rising to 20s. a day, with 8s. a day flying pay whilst employed on duty which involves flying.

Major —32s. } a day inclusive.
Lieutenant-Colonel—40s. }

The above rates are exclusive of free quarters, rations, fuel, light and servant, or allowance in lieu. Officers serving with expeditionary forces also draw a field allowance. Up to and

including the rank of lieutenant, married officers may receive an allowance for children. A successful pilot may arrive at his commission with the full pay and duties of a flying officer, in from four to six months after joining, and it may be added that in the Royal Air Force, the prospects of distinction and subsequent promotion, are unrivalled. Pension and half-pay rates and conditions have not yet been finally settled. Applications to join should be made in letter form, stating full personal particulars, to the Royal Air Force Reception Depot (see last page) which is nearest to the residence of the applicant, or address where he is registered under the Registration Act.

Men.

Period of Service.—(1) Duration of war; (2) Normal period, i.e., (a) Four years with the Colours and four years on the Reserve. Men may, six months before the termination of four years' Colour service (if recommended by their Commanding Officer and Air Ministry Authority is given), extend their period of Colour service to complete eight years with the Colours and four years on the Reserve; (b) Eight years with the Colours and four years on the Reserve. Men in either paragraphs (a) or (b) may, six months before the termination of eight years' Colour service (if recommended by their Commanding Officer and Air Ministry Authority is given), re-engage to complete their Colour service to qualify for pension. Fourteen days' leave will be granted to men re-engaging after completing continuous service engagement, if the exigencies of the Service permit.

Age.—18 to 41 years for duration of war; the maximum may, in special cases, be increased to 50 years. 18 to 25 for normal period.

Candidates for normal period of service, are subject to examination by a Royal Air Force Medical Officer before acceptance.

Applications for enlistment should be made personally or by letter, stating full particulars, including age and trade to the Royal Air Force Reception Depot nearest to the residence or place of Registration of the applicant.

Men are required for the following trades and employments:

Technical.

Acetylene welder; armourer; blacksmith; boat builder; camera repairer; carpenter; coppersmith; draughtsman; driver: motor-boat, petrol, steam; electrician; fitter: aero engine, general, mechanical transport, jig and tool makers, hydrogen worker; instrument repairer; kite balloon telephonist; magneto repairer; millwright; motor body builder; motor boat coxswain; moulder; observer; packer; painter; pattern-maker; photographer; pilot; propeller maker; rigger (aeroplane); rigger (airship); tinsmith and sheet metal worker; turner; upholsterer; vulcaniser; winch driver and fitter; wireless mechanic; wireless operator.

These will, if suitable, be appointed in the Royal Air Force, according to ability, as 3rd, 2nd or 1st Class Mechanics.

Non-technical.

Aerial gunner; assistant armourer; batman; butcher; cook; coppersmith's mate; disciplinarian; fabric worker; hospital orderly; labourer; packers' mate; painter's mate; motor cyclist; shoemaker; tailor; telephone operator.

These will, if suitable, be appointed in the Royal Air Force, according to ability, as 2nd or 1st class privates.

All learners will be entered in the "Non-technical" category and be re-mustered to the "Technical" category when sufficiently qualified to be able to pass the prescribed examination.

Clerks and Storemen.

These will, if suitable, be appointed in the Royal Air Force, according to ability, as 3rd, 2nd or 1st class clerks.

War Pay.—War Pay at 1d. a day for each year of service rendered since the commencement of the war will, subject to good conduct, be given to privates 2nd class, and clerks 3rd class only.

Peace Conditions.—A married establishment will probably be determined, but conditions cannot be stated in detail until the general policy after the war in this respect has been determined.

Promotion.—Promotions and the consequent increases of pay are rapid at the present time, subject only to skill and the behaviour of the men. For this reason Good Conduct Badges with pay will not be awarded to members of the Royal Air Force.

Pensions.—Have not yet been determined; it may, however, be taken for granted that the amounts payable will not be less than those awarded to men who have qualified for pensions in the Army.

Boys.

The Royal Air Force will be open to receive boys from time to time for long service only, between the ages of 15 and 17 years.

Period.—(a) 8 years with the Colours, including period served prior to attaining the age of 18 years and 4 years on the reserve.

(b) Six months before the termination of 8 years' service with the colours, they may, if recommended by their Commanding Officer and Air Ministry Authority is given, re-engage to complete their colour service to qualify for pension.

Rate of Pay.—1s. per diem with free kit, food, etc., and war pay at 1d. a day for each year of service rendered during the war, subject to good conduct. On attaining the age of 18 years boys will be appointed 3rd class air-mechanics at 2s. per diem.

Boys will have an opportunity of learning a trade, which should be useful to them on their discharge. All boys have to attend Divine Service at least once a week. Boys are housed together under specially selected disciplinary non-commissioned officers. The regular working hours for boys do not exceed 48 hours per week. In the case of boys under 17, they do not exceed 40 hours per week. Systematic arrangements are made for the boys' education, recreation and amusements.

Medical Classification.—Grade 1 only. Applications for

enlistment should be made by letter, stating full particulars, including trade (if any). The following certificates will be required before completion of enlistment:—1. Written consent of parents or guardians, duly witnessed. 2. Certificate of good moral character from clergyman. 3. Certificate of birth. 4. Certificate of schoolmaster of having passed Standard VI, or an educational equivalent thereto.

Applications should be made to the Royal Air Force Reception Depot nearest to the residence or place of registration of the applicant.

No person is eligible for enlistment into the Royal Air Force unless he is a natural born British subject and the son of natural born British subjects.

Royal Air Force Reception Depots.

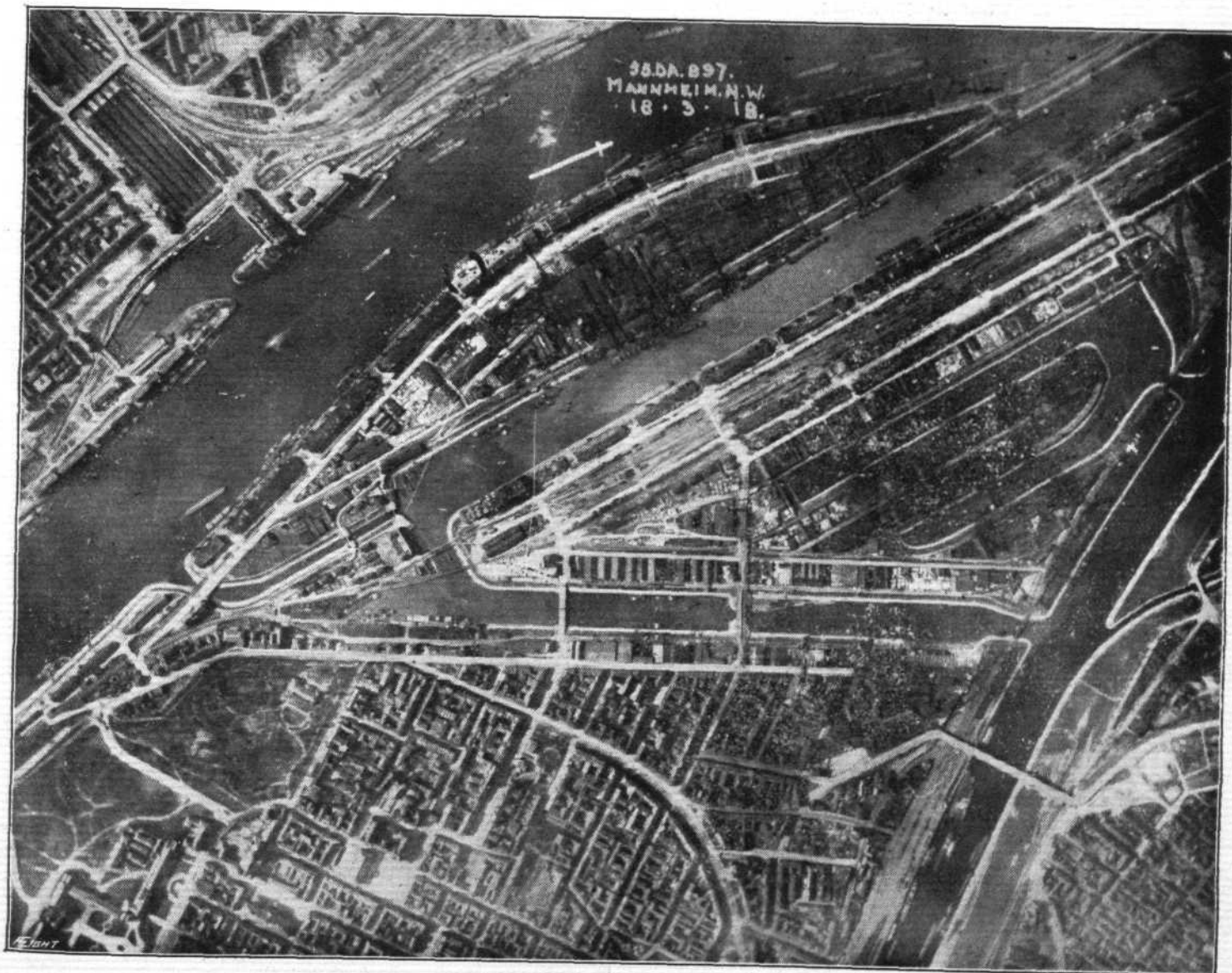
- No. 1.—40, Upper Brook Street, Mayfair, W.1., London.
- No. 2(a).—8, Tyndalls' Park Road, Bristol.
- No. 2(b).—12, Newport Road, Cardiff.
- No. 3.—Carlton Chambers, Paradise Street, Birmingham.
- No. 3(a).—Midland Bank Warehouse, King Street, Nottingham.
- No. 3(b).—117, Mount Pleasant, Liverpool.
- No. 4(a).—6, Portland Crescent, Leeds.
- No. 4(b).—10, Sydenham Terrace, North Road, Newcastle-on-Tyne.
- No. 5.—9, Somerset Place, Sauchiehall Street, Glasgow.

Memorial to Captain Ball, V.C.

By way of perpetuating the gallant deeds of his son, Capt. Albert Ball, V.C., Alderman Ball, ex-Mayor of Nottingham, intends to build, at a cost of £10,000, memorial homes for soldiers' mothers and widows. The homes are to be erected in the part of the city where Capt. Ball was born.

The Raid on Paris.

SUPPLEMENTING the first official note, it was later stated that in the raid on Paris on the night of April 1st-2nd, one German aeroplane succeeded in getting over the French capital. Bombs were dropped, but no casualties were reported.



THE AIR RAID ON MANNHEIM ON MARCH 18TH.—Note the bomb-burst on the quay on the east bank of the Rhine.

British Official.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE FLYING SERVICES FUND administered by THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps, who are incapacitated on active service, and for the widows and dependants of those who are killed.

The fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 3, Clifford Street, New Bond Street, London, W.1.

Subscriptions.

	£	s.	d.
Total subscriptions received to March 28th, 1918	12,647	2	1
Lieut.-Col. A. H. B. Hume	1	1	0
Staff and Workers of Gwynnes, Ltd. (Sixtieth contribution)	10	7	9
Profit on R.N.A.S. Ball at Eastbourne	30	0	0
Collected by Employes of Aircraft Supplies Co., Ltd., 125, Long Acre, W.C.	3	7	2
"Anon."	1	0	0

Total, April 9th, 1918 12,692 18 0

H. E. PERRIN, Secretary.

3, Clifford Street, New Bond Street, W.1.

THE ROLL OF HONOUR.

Reported by the Admiralty:—

Accidentally Killed.

Flight Sub-Lieut. H. E. Love, R.N.

Accidentally Drowned.

Flight Sub-Lieut. N. Mallard, R.N.

Died of Injuries.

Flight Sub-Lieut. H. A. Connop, R.N.

Flight Sub-Lieut. L. E. Oakeshott, R.N.

Missing.

Flight Sub-Lieut. J. G. Carroll, R.N.

Flight Sub-Lieut. E. C. Stocker, R.N.

Reported by the War Office:—

Killed.

2nd Lieut. J. B. Bennett, R.F.C.

2nd Lieut. R. A. Coatman, R.F.C.

2nd Lieut. R. M. Lees, R.F.C.

Lieut. W. J. Shorter, Essex Regt., attd. R.F.C.

Lieut. M. Sworder, Can. Cav., attd. R.F.C.

Lieut. F. S. Vaughan, R.W. Kent Regt., attd. R.F.C.

2nd Lieut. R. E. M. Worsley, R.F.C.

2nd Lieut. J. D. Wyatt-Smith, R.F.C.

Previously Missing, now reported Killed.

Lieut. R. E. Angus, Yeo., attd. R.F.C.

2nd Lieut. H. D. Barbour, R.F.C.

2nd Lieut. W. Bevan, R.F.C.

2nd Lieut. G. P. Bradley, R.F.C.

Lieut. E. D. S. Casswell, Rif. Brig., attd. R.F.C.

2nd Lieut. E. V. Clark, R.F.C.

2nd Lieut. R. L. Curtis, R.F.C.

2nd Lieut. E. S. Davenport, R.F.C.

2nd Lieut. W. de C. Dodd, R. Munster Fus., attd. R.F.C.

Capt. R. Erskine, R.F.C.

2nd Lieut. C. E. Ferguson, R.F.C.

Capt. A. W. Field, R.F.C.

2nd Lieut. J. G. Glendinning, Mon. R., attd. R.F.C.

Lieut. F. B. Gloster, A.S.C., attd. R.F.C.

2nd Lieut. C. R. B. Halley, R.F.C.

2nd Lieut. G. J. Howells, R.F.C.

Lieut. A. Hutchinson, Liverpool R., attd. R.F.C.

Lieut. E. H. Kann, R.F.C.

2nd Lieut. H. P. Ledger, R.F.C.

2nd Lieut. C. N. Madeley, R.F.C.

2nd Lieut. L. Marshall, R.F.C.

2nd Lieut. W. G. Mann, R.F.C.

2nd Lieut. W. F. G. March, R.F.C.

Capt. R. A. Maybery, M.C., Lancers, attd. R.F.C.

2nd Lieut. O. W. W. H. Meredith, R.F.C.

2nd Lieut. G. Noon, Sher. For., attd. R.F.C.

2nd Lieut. J. T. Orrell, R.F.C.

Lieut. D. M. Paton, R.F.C.

Capt. A. F. E. Pitman, Scaforth Highrs., attd. R.F.C.

2nd Lieut. E. W. Powell, R.F.C.

2nd Lieut. S. W. Randall, R.F.C.

Lieut. A. P. F. Rhys-Davids, D.S.O., M.C., R.F.C.

2nd Lieut. A. Rosenthal, R.F.C.

Capt. F. H. B. Selous, M.C. R.W. Surrey Regiment, attd. R.F.C.

2nd Lieut. W. S. Smith, W. Yorks. Regt., attd. R.F.C.

Lieut. I. L. Stockhausen, Brit. W. Indies Regt., attd. R.F.

93629 2nd Air-Mech C. A. Blatherwick, R.F.C.

1391 Corpl. L. S. Goss, R.F.C.

6717 Sergt. A. O. Stanley, R.F.C.

2nd Lieut. A. N. Westlake, M.C., North Staffordshire Regt., attd. R.F.C.

2nd Lieut. K. H. Willard, York and Lancs. Regt., attd. R.F.C.

2nd Lieut. A. E. Wylie, R.F.C.

Previously Missing, believed Killed, now reported Killed.

2nd Lieut. H. L. Marvin, R.F.C.

Died of Wounds.

2nd Lieut. J. R. W. Thompson, R.F.C.

Previously Missing, now reported Died of Wounds as Prisoner in German hands.

Lieut. R. B. Steele, I.A.R.O., attd. R.F.C.

Previously Missing, now reported by the German Government Killed or Died of Wounds.

Lieut. D. N. Ross, B.C.R., attd. R.F.C.

61603 2nd Air-Mech. F. J. Ridgway, R.F.C.

Previously reported Prisoner, now reported Died of Wounds as Prisoner in German hands.

2nd Lieut. T. A. Unwin, R.F.C.

Accidentally Killed.

Lieut. W. Beckton, R. Welsh Fus., attd. R.F.C.

Lieut. W. E. Carter, Can. Cav., attd. R.F.C.

Capt. H. F. Morrell, Brit. W. Ind. Regt., attd. R.F.C.

Died.

P/3173 3rd Air-Mech. W. Lindsay, R.F.C.

Wounded.

2nd Lieut. D. Adams, R.F.C.

2nd Lieut. T. W. Barlow, R.F.C.

Lieut. E. C. Batchelor, R.F.A., attd. R.F.C.

2nd Lieut. L. J. Bayley, S. Lancs., attd. R.F.C.

Capt. B. P. G. Beanlands, M.C., Hamp., attd. R.F.C.

2nd Lieut. B. J. Bevan, R.F.C.

2nd Lieut. A. C. G. Brown, R.F.C.

Capt. R. E. Bryson, R.F.C.

2nd Lieut. N. Bury, R.F.C.

Lieut. C. A. Chisnall, Aldt. attd. R.F.C.

2nd Lieut. A. E. I. Clifford, R.F.C.

2nd Lieut. H. Cornford, R.F.C.

2nd Lieut. R. A. Curry, R.F.C.

2nd Lieut. H. C. E. Daggett, R.F.C.

Capt. W. Deane, Norf., attd. R.F.C.

2nd Lieut. Lord C. C. Douglas, K.O.S.B., attd. R.F.C.
 2nd Lieut. N. M. Drysdale, R.F.C.
 2nd Lieut. J. Edelsten, Dorset, attd. R.F.C.
 Lieut. C. C. F. Ekins, Essex, attd. R.F.C.
 2nd Lieut. G. E. F. Elliott, R.F.C.
 Lieut. L. S. Gray, London, attd. R.F.C.
 2nd Lieut. H. Greene, R.F.C.
 2nd Lieut. H. Hanson, R.F.C.
 Lieut. F. V. Heakes, Cent. Ont. attd. R.F.C.
 2nd Lieut. R. Hegan, R. Warw., attd. R.F.C.
 2nd Lieut. L. G. Heigham-Plumtre, Bedford, attd. R.F.C.
 2nd Lieut. C. A. Hore, M.C., N. Staffs, Attd. R.F.C.
 2nd Lieut. G. R. Howsam, M.C., R.F.C.
 2nd Lieut. F. T. Jackson, R.F.C.
 2nd Lieut. B. J. Johnstone, R.F.C.
 2nd Lieut. L. E. Jones, R.F.C.
 2nd Lieut. F. Keith, R.F.C.
 Lieut. A. P. Kelly, R.F.C.
 2nd Lieut. J. E. A. Kernahan, R.F.C.
 Lieut. W. R. Lewis, R.F.C.
 Lieut. T. E. Logan, N.S.R., attd. R.F.C.
 2nd Lieut. J. G. W. March, R. War., attd. R.F.C.
 2nd Lieut. A. O. Matt, R.F.C.
 Lieut. C. B. Matthews, R.W. Surrey Regt., attd. R.F.C.
 Lieut. M. S. McLean, N.S.R., attd. R.F.C.
 Lieut. C. K. S. Metford, R.F.A., attd. R.F.C.
 2nd Lieut. G. J. Mortimer, R.F.C.
 2nd Lieut. R. G. Mitchell, R.F.C.
 Capt. G. Murray, R.F.C.
 Capt. A. H. Orlebar, Bedford, attd. R.F.C.
 Lieut. D. W. Orr, Wilts, attd. R.F.C.
 Capt. E. T. Owles, M.C., R. Irish Fus., attd. R.F.C.
 Capt. M. M. Pakenham, A.S.C., attd. R.F.C.
 Lieut. S. F. Parker, Middx., attd. R.F.C.
 2nd Lieut. J. K. von J. Peden, R.F.A., attd. R.F.C.
 2nd Lieut. A. D. Pope, R.F.C.
 Lieut. F. J. Pullen, Welsh, attd. R.F.C.
 2nd Lieut. J. H. Reeves, R.F.C.
 2nd Lieut. R. C. Richards, R.F.C.
 2nd Lieut. G. Richardson, R.F.C.
 2nd Lieut. H. J. Richardson, R.F.C.
 Lieut. W. A. B. Savile, R.F.A., attd. R.F.C.
 2nd Lieut. K. A. Seth-Smith, Northd. Fus., attd. R.F.C.
 2nd Lieut. R. J. Smith, R.F.C.
 2nd Lieut. C. B. Stringer, R.F.C.
 Capt. N. W. Taylor, Can. A.S.C., attd. R.F.C.
 Lieut. H. V. L. Tubbs, Lond. Regt., attd. R.F.C.
 2nd Lieut. R. B. E. Turnbull, R.F.C.
 Lieut. W. H. Valentine, R.F.C. (2nd Lieut., Lab. Corps).
 Lieut. W. H. M. Wardrope, Can. Cav., attd. R.F.C.

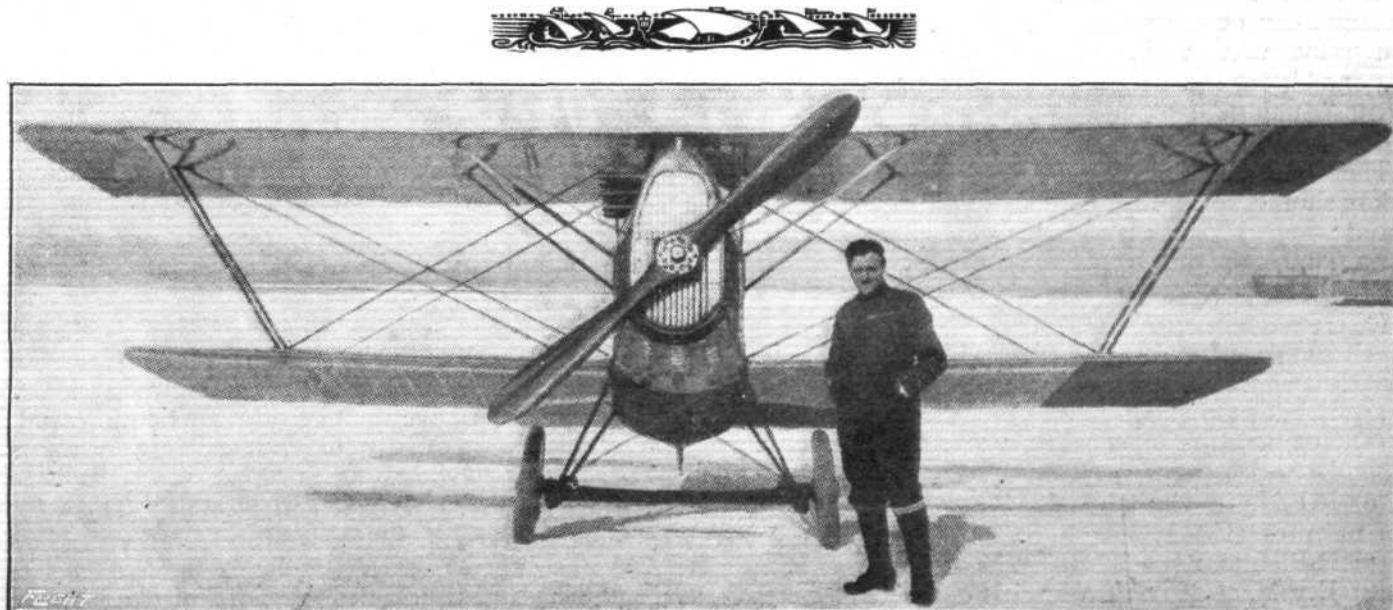
Missing.

2nd Lieut. J. R. Aikins, R.F.C.
 2nd Lieut. C. B. Banfield, R.F.C.
 Capt. H. W. E. Barwell, M.C., R.F.C.
 2nd Lieut. T. E. H. Birley, R.F.C.
 2nd Lieut. H. P. Blake, R.F.C.
 2nd Lieut. J. O. Butler, R.F.C.
 2nd Lieut. D. Cameron, R.F.C.

Lieut. F. H. Cantlon, M.C., Cent. Ont. Regt., attd. R.F.C.
 2nd Lieut. H. K. Cassels, R.F.C.
 Lieut. E. M. Chant, B.C.R., attd. R.F.C.
 2nd Lieut. A. F. G. Clarke, A.S.C., attd. R.F.C.
 2nd Lieut. C. H. Clarke, R.F.C.
 2nd Lieut. C. W. Cook, R.F.C.
 Lieut. J. D. Currie, High. L.I., attd. R.F.C.
 2nd Lieut. E. Dennis, Sher. For., attd. R.F.C.
 2nd Lieut. R. H. Edelston, R.F.C.
 Lieut. L. A. Edens, R. Newf. R., attd. R.F.C.
 Capt. A. J. Evans, M.C., R.F.C.
 2nd Lieut. R. P. Fenn, R.F.C.
 Lieut. W. G. Fluke, D.S.O., S. Staff. R., attd. R.F.C.
 2nd Lieut. W. G. Francis, R.F.C.
 2nd Lieut. W. M. R. Gray, R.F.C.
 Lieut. J. M. Hay, Ches., attd. R.F.C.
 2nd Lieut. K. V. Highton, R.F.C.
 2nd Lieut. V. Hyatt, R.F.C.
 2nd Lieut. W. M. Irvine, Northumberland Fus., attd. R.F.C.
 2nd Lieut. A. T. Isbell, R.F.C.
 Lieut. A. R. James, Yeo., attd. R.F.C.
 2nd Lieut. R. H. Kirkaldy, R.F.C.
 2nd Lieut. D. W. Kent-Jones, R.E., attd. R.F.C.
 Capt. J. E. J. Kilkelly, R. Muns. Fus., attd. R.F.C.
 2nd Lieut. F. K. Kneller, R.F.C.
 2nd Lieut. W. Knox, R.F.C.
 Capt. J. M. MacIlwaine, R. Ir. Rif., attd. R.F.C.
 Capt. A. P. MacLean, Cent. Ont. Regt., attd. R.F.C.
 Capt. R. H. Martin, W. Ont. R., attd. R.F.C.
 Lieut. J. McCone, Can. Eng., attd. R.F.C.
 Lieut. M. E. Mealing, Shrop. L.I., attd. R.F.C.
 2nd Lieut. A. A. Miles, R.F.C.
 2nd Lieut. C. Miller, R.F.C.
 2nd Lieut. F. Naylor, N. Lancs., attd. R.F.C.
 2nd Lieut. G. G. Newbury, R.F.C.
 2nd Lieut. W. H. Nicholls, Aus. F.C.
 2nd Lieut. G. R. Norman, R.F.C.
 2nd Lieut. G. H. Parker, R.F.C.
 2nd Lieut. B. G. Poole, R.F.C.
 2nd Lieut. W. Porter, R.F.A., attd. R.F.C.
 2nd Lieut. R. S. F. D. Radcliff, R.F.C.
 Lieut. A. Reeve, Cent. Ont. R., attd. R.F.C.
 2nd Lieut. H. J. C. Reynish, R.F.C.
 2nd Lieut. N. H. Thackrah, R.F.C.
 Capt. P. Thompson, R.F.C.
 2nd Lieut. D. C. Tucker, R.F.C.
 Lieut. J. H. Wensley, Sask. Regt., attd. R.F.C.

Previously Missing, now reported Prisoner in German hands.

2nd Lieut. C. H. S. Ackers, K.R.R.C., attd. R.F.C.
 2nd Lieut. A. Couston, Aus. F.C.
 2nd Lieut. A. Fielding Clarke, R.F.C.
 2nd Lieut. F. C. Gilbert, R.F.C.
 Lieut. G. G. Jackson, R.F.C.
 Lieut. J. R. Law, Can. A.S.C., attd. R.F.C.
 2nd Lieut. R. MacDonald, R.F.C.
 2nd Lieut. S. G. Williams, M.C., Devon R., attd. R.F.C.
 2nd Lieut. B. C. W. Windle, R.F.C.



The Italian Pomilio fighting scout.

("Aerial Age," U.S.A.)

TUNING UP AERO ENGINES FOR SPECIAL SERVICE.

By "GNOMAD."

THE writer approaches the above subject with very considerable diffidence, and wishes it to be very clearly understood that the following article is in no way intended to be construed into a suggestion that engines in everyday use should be "tuned up" in the following way! On no account should any engine be altered or adjusted in any way, to give more power than its standard rating, unless with the express permission of a competent authority, and still more important, the proper authority having been obtained, the engine should not be used except by a pilot who appreciates to the full, what has been done, and who will "nurse" his engine in light of this knowledge.

The stationary, water-cooled type of engine lends itself more readily to "tuning" operations, under Service conditions, than rotary or radial types; and it is, therefore, to the stationary engine that the following remarks apply.

It will be well to employ the methods herein advocated, on an engine which has seen a fair amount of service, and on no account should a new engine be altered. One that has seen a fair amount of service, and which has done in the neighbourhood of 600 to 1,000 hours, is the best subject. Among many reasons, the following will be apparent. The engine will be well "run in," that is, bearings will be "bedded in," cylinder walls and pistons will have acquired running "faces," valves will have assumed a certain permanency of shape, or will have "distorted" as much as they are likely to, and, generally speaking, any defects in materials or construction will have appeared, if there be any. We will assume that an 8 or 12 cyl. Vee-type water-cooled engine has been selected, and that it is in ordinary everyday repair, being fitted in a machine ready for flight. The engine should be run on the ground and flown for the purpose of taking a full detailed "log" of its performances, and if the machine can be flown by the pilot who will be responsible for the subsequent "tuning," so much the better.

The following particulars should be carefully noted:—

- (1) Time engine is started.
- (2) Time taken to "warm up."
- (3) Temperature of atmosphere and general atmospheric conditions. (See note re Fan brakes.)
- (4) R.P.M. (on ground).
- (5) Temperature of cooling water before leaving ground.
- (6) R.P.M. in the air, showing variations every ten minutes.
- (7) R.P.M. at 1,000 ft.
- (8) R.P.M. at 10,000 ft.
- (9) Note should be taken of the general adjustments of the engine, prior to flight, detailing:—

Tappet clearances, throttle and ignition settings, position of throttle and ignition levers, carburettor adjustment, &c.

(10) After 60 minutes' flight, and immediately on landing, take water temperature and note fuel and oil consumptions.

We shall now have a series of results on which to base an attack in favour of improvements.

The engine, on being removed from the machine, should be "stripped" and thoroughly cleaned. Various reciprocating parts must be carefully weighed, and the following must be included: Pistons, connecting rods, the eight or twelve pistons, as the case may be, must be carefully balanced, so that every one is *exactly* the same weight, any differences in weight being adjusted by placing the heavy pistons in the lathe and skimming the inside surface, care being taken *not* to remove metal from the *bottom* of the piston skirt.

In balancing the connecting rods, care must be taken to remove the weight from the *correct point*, as, if one rod is slightly heavier than another, the extra weight may be nearer one end than the other.

In balancing rods, the writer adopted the following method.

The rods were suspended by first one end and then the other, the suspended end being supported on a knife edge, and the free end resting upon a small pair of scales, the "weights" used were a number of ordinary shot gun "shot," the difference in the number of "shot" showing the amount of metal to be removed from the heavy rod or part of rod. The following sketch will give an idea of the method employed.

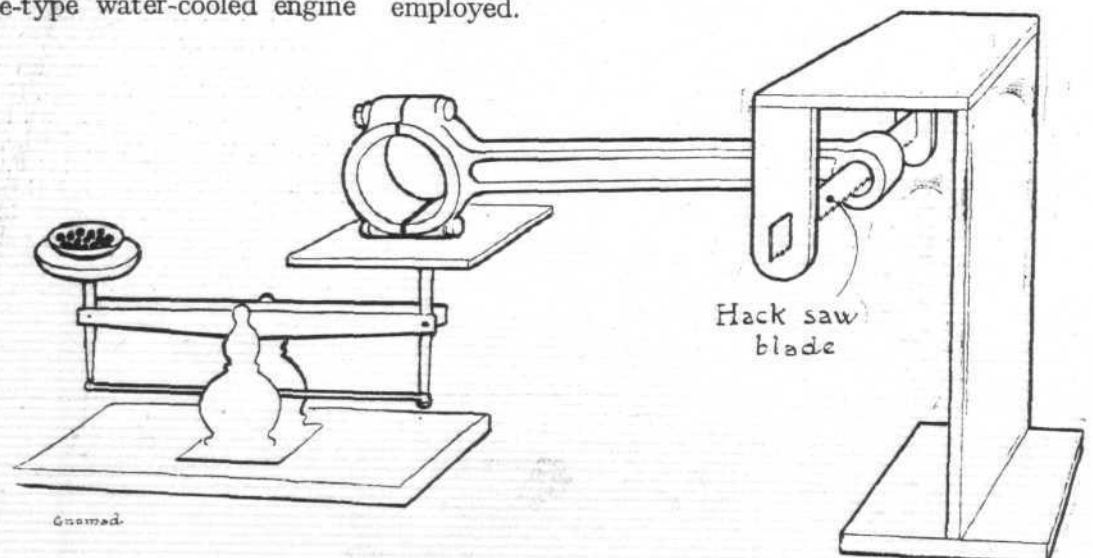


Fig. 1.

By weighing the rods in this way, first weighing the "small" end and then the "big" end, the real differences in weight will be found, and the actual place to remove metal from will be indicated.

This careful balancing of reciprocating parts is all-important, tending, as it does, to eliminate periodic vibration, and its attendant evils. The want of balance in reciprocating parts can set up enormous strains and impose dangerous loads on the crankshaft and bearings, and as it is proposed to increase the r.p.m. of an engine, the question of balance becomes extremely important.

Valves.—The two sketches shown below show the form of two average valves.

It will be seen that dotted lines have been drawn, cutting off a part of the valve, these lines show the part of the valve to be cut away, leaving the seating only $\frac{3}{8}$ in. in width. The corners (shown at "B") should be removed in the lathe, leaving a rounded

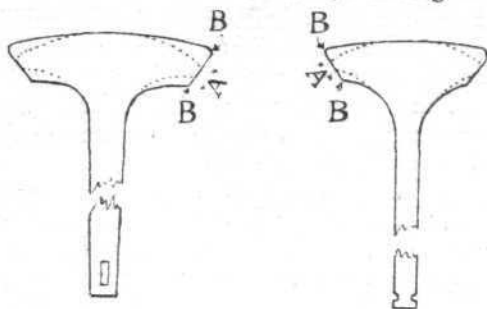


Fig. 2.

edge, which eases the ingress or egress of the gases. The reduction in the width of the seating lessens the effective "life" of the seating, but improves its quality; the attendant lightening of the valve is all to the good, reducing the load on the camshaft. We will not go into the question of the inertia of the gases in the inlet pipe and valve ports or passages, important though it be, except to remark that these gases have to make their entry into the cylinder at a very high velocity, and on this account, it is of the highest importance that its passage should be as free as possible, which is ensured by making the inside surfaces of the inlet manifold and ports as smooth as possible. All sharp edges must be rounded off and the corners radiused, as they would otherwise tend to set up eddies in the gas flow. As regards the combustion chamber, this should be made as smooth as its accessibility will allow, the smooth surface then being wiped with oil which has a big percentage of deflocculated graphite mixed into it. The excellent properties of this form of graphite are not nearly so widely known as its qualities warrant, and a few words regarding it will not be misplaced. Graphite, when deflocculated, while not becoming soluble in oil, is capable of being held in suspension in that medium, being split up into particles of infinitesimally small size. These particles form a practically homogeneous "face" on the cylinder walls, or any other parts which slide or are subject to frictional contact. If the reader should happen to have an engine which is inclined to be heavy on oil consumption, an admixture of this graphite will speedily improve it. To revert to the matter in hand, the reader will have gathered, ere this, that the smallest points are not to be overlooked in getting every ounce of power, which can be got without going to extremes, and one of the "small points" is the fit of the pistons in their respective cylinders. Few people realise what an extremely delicate thing the average piston of an aero engine may be. A very slight tap may distort a piston to an extraordinary degree. Should the reader doubt this, let him obtain the piston of an Austro-Daimler engine (or Beardmore) and carefully take the diameter of it. Then let him administer what he thinks is "a slight tap," and then check the diameter again! A series of "taps" at different points will show that the piston can be "tapped" into and out of shape in a really astonishing manner. To return to the fit of the pistons, let the cylinder and piston be thoroughly

cleaned and wiped dry, then apply some "rubbing" to the cylinder walls, taking care to only apply it very lightly; lamp black (not red lead) should be used, the latter being too coarse, and hence not readily applicable when fine results are needed. The piston will then show if there are any "high places." These can be removed by scraping, or should the engine be one employing pistons similar to the "Beardmore," the aforementioned light tapping will often correct any slight distortion. Lapping the piston and rings into the cylinder with pumice powder may give the final finish. The question of compression is approached with certain misgivings, and yet it cannot be omitted. Needless to say, "good" compression is a *sine qua non*, but the writer cannot advocate increasing the compression beyond that point, which can be gained by avoiding the loss of the compression which the designers and makers between them may have settled upon. In one instance, the writer deliberately increased the compression of an old engine, which had seen many hundreds of hours in the air on a school machine, and when this long-suffering engine had been subjected to many of the "hints and tips" here retailed, it gave surprisingly good results, although it then ran at about 400 to 450 r.p.m. more than it had been allowed to by the makers. While on this subject, it may be well to mention that an "Indicator" should be used to test the compression. There are several of these on the market, which, if carefully used, will give accurate results. It is of great importance that the compression in each cylinder should be equal, to ensure even and "sweet" running, lack of vibration and so forth. All exhaust and inlet springs should be tested to ensure against loss of elasticity. A certain weight should depress the spring a certain known distance.

A small device may easily be constructed for gauging the tension of the spring, as shown in the sketch (Fig. 3).

One cannot lay down any directions for fitting bearings, as this depends entirely on the skill of the

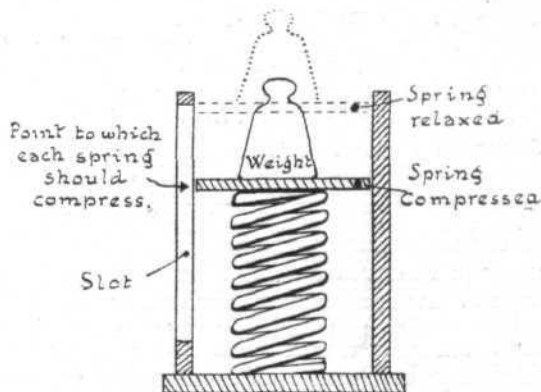


Fig. 3.

fitter who does the job, and there is no doubt that some of the finest engine fitters are to be found in the ranks of the Flying Services. It is only necessary to point out that the crankshaft bearings must be perfectly fitted, ensuring both absence of vibration and correct lubrication. It is almost superfluous to say that big ends and small ends must also be perfect.

Carburation.—As these notes are not directly applicable to any one make, type or power of engine, no very definite instructions can be laid down, but the following notes may not be out of place. In

order to get correct carburettor settings the following results must be attained:—(1) Correct jet; (2) correct slow running or auxiliary jet; (3) correct choke tube.

It will be obvious that with the above three quantities an endless number of variations can be obtained, and only one combination will be correct.

It is necessary to run the engine at high and low speeds, noting any peculiarities of the running at both speeds, also the properties of acceleration must be noted, the engine must (1) run slowly *with a correct mixture*; (2) run at its maximum speed with a correct mixture; and (3) accelerate from slow to high speeds readily.

When the engine is run slowly, the engine must turn evenly, with no popping in the carburettor, no "hunting," and no firing in the exhaust. The above symptoms indicate too small a jet. (It is assumed that the engine has been warmed up before any note is taken of its running.)

It is, of course, assumed that any symptoms noticed are not due to such mechanical causes as a valve sticking, or a magneto rocker arm not functioning correctly.

The warming of the carburettor is important to prevent condensation in the induction system, and care should be taken to see that the hot water circulation functions correctly. The petrol air pressure gauge should be tested for accuracy, as, in the event of a false reading, erroneous deductions may be made regarding the behaviour of the engine. The revolution counter should also be carefully gone over, and its readings checked. This is especially important owing to the number of these instruments which do not register correctly. A point that is worth noting, while on the subject of "Revolutions," is the question of horse-power, as absorbed at a certain number of r.p.m. by the propeller. The propeller is, to all intents and purposes, an air brake, and it is well known that an air brake is *far* from being a satisfactory means of recording horse-power.



Kaiser Honours von Richthofen.

FOLLOWING the announcement that Cavalry Capt. Baron von Richthofen had brought down his 75th opponent comes the announcement that the Kaiser has bestowed on him the order of the Red Eagle with Crown and Swords.

Crack Austrian Pilot Killed.

It was announced in Rome on April 4th that Italian pilots had brought down in flames the machine piloted by the Austrian pilot Capt. Tutcheck, who it was stated had shot down 27 Italian aeroplanes.

Huns Blaming the Weather.

A MESSAGE sent out from Berlin on April 5th stated that the operations of the German airmen were hampered during the last days of March owing to rain and storms, so that they could only reconnoitre for short distances, and were unable to attack in and behind the fighting line. As the weather became more favourable reconnaissances over greater distances were effected, especially on April 1st, when several aerial combats occurred.

German Machine in Holland.

A GERMAN machine with a corporal as pilot landed at Aardenburg in Holland on April 2nd, having strayed off its course on the way to Bruges. The pilot has been interned.

The Castor Oil Supply.

At the instigation of the American aviation authorities during this spring, large areas are being planted with castor beans in several of the Southern States of America with a view to securing an ample supply of castor oil. It is stated that in peace time about a million bushels of castor beans are used in the States.

Fatal Accidents.

At a Lincolnshire aerodrome on April 3rd a machine

An air, or, as it is generally called, a fan brake is extremely susceptible to conditions of atmosphere, and to the proximity of an obstruction of any sort that is liable to interfere with the air which is displaced by its motion, or the stillness or otherwise of the air in which it is revolving, and for this reason it is necessary to be certain that the notes taken regarding an engine's performances are taken under satisfactory conditions—the ideal conditions, of course, being an open space and as little wind as possible. The proximity of walls, buildings, trees, or even other machines, is liable to give results that are not so accurate as they should be.

To return to the question of carburettor adjustments, the choke tube, being the means of regulating the "drag" on the fuel in the jet, is of great importance. controlling the slow running and acceleration. If the choke tube be too large, the engine will not accelerate properly, whereas a small choke will give good acceleration, but the engine will not "revolve" satisfactorily. As the ignition may be slightly more advanced than its standard position, note should be taken that, occasionally, "popping" in the carburettor may be attributed to an "over-advance" of the spark. When the engine is finally assembled, and is being subjected to the above "tuning," a carefully tabulated "log" should be kept on the same lines as the one specified at the beginning of this article, *especially* as regards the *fuel consumption* under various conditions of jets, choke tubes, auxiliary or compensating jets. A vast amount of invaluable knowledge may be gleaned from a "log" of this description, if it has been really conscientiously kept. If some of the ways and means advocated in these notes appear to the reader to be "too small to matter," he is respectfully asked to bear in mind that *perfection in every detail* should be sought after when aero engines are under discussion, and that the familiarity which is bred of knowledge of the results attained by this perfection will never beget contempt for the methods employed.

crashed into another which was stationary on the ground, and Lieut. S. Huguenin, of the American flying contingent, Corporal B. J. Seifert, and Private N. Krautman were killed. A fourth man was badly injured. At another Lincolnshire aerodrome Lieut. J. G. Moore, who recently arrived from India, was killed in a flying accident.

At an inquest on April 4th on 2nd Lieut. David Christie, a young Canadian, whose machine nose-dived to earth, it was stated that he began to turn at a hundred feet—a dangerous proceeding. He was a good pilot, but had committed an error of judgment. A verdict of "Accidental Death" was returned.

An aviation accident, resulting in the death of two airmen, occurred at Montrose on April 4th. While Lieut. Burton and Lieut. Payne were in the air their machines collided, and spun head first to the ground, both men being instantaneously killed. Two young flying officers, 2nd Lieuts. H. C. Tucker and H. S. A. Dunlop, were also killed while flying in the East Midlands. Their machine nose-dived and fell. Tucker was an experienced aviator, and was acting as instructor.

2nd Lieut. N. H. England, 2nd Lieut. C. Hackman and 2nd Lieut. V. R. Craigie were killed at Chichester during the week-end. The two former were in a dual-control machine which was in collision with a single-seater, piloted by 2nd Lieut. Craigie.

While flying off the Scottish coast an aeroplane piloted by Lieut. Hay came down in the sea and the pilot was drowned.

A Danish Double Fatality.

A DANISH seaplane was wrecked in the Cattegat on April 6th and the pilot and another officer on board were drowned.

INTERNATIONAL AIRCRAFT STANDARDS.

(Continued from page 376.)

4P3—Specifications for Plain and Ball Head Bolts for Aircraft.

GENERAL.—1. The general specifications, 1Gr, shall form, according to their applicability, a part of these specifications.

USE.—2. These bolts are to be used in plane construction.

MATERIAL.—3. These bolts shall be made of alloy steel conforming to I.A.S.B. specification 383. The bolts shall be machined preferably from heat-treated, cold-drawn bars. They shall first be copper-plated in a cyanide bath and then nickel-plated; the coating shall not exceed 0.001 in. (0.0254 mm.) in thickness.

HEAT TREATMENT.—4. Unless made from heat-treated cold-drawn bars, the bolts shall be heat treated after machining to give the required physical properties.

PHYSICAL PROPERTIES AND TESTS.—5. The bolts must have the following physical properties.

Tensile Test.—(a) The breaking load of the bolts tested in tension between the head and nut shall not be less than the area of the root of the thread multiplied by 100,000. The minimum breaking loads calculated in this manner are given in the tables below.

Bend Test.—(b) The bolts shall withstand being bent cold through 180 degrees around a pin of thickness equal to the diameter of the bolt. If the bolt is not long enough to be

dimensions within the tolerances given in Tables 1 and 2. The values given represent the finished dimensions after copper and nickel plating.

DELIVERY, PACKING, AND SHIPPING.—7. The bolts shall be delivered in boxes of gross weight not exceeding 50 lb. (22.7 kg.); the lots of individual sizes shall be packed in strong manila envelopes or cartons.

3S19—Specifications for Galvanised Steel Service or Locking Wire.

GENERAL.—1. The general specifications, 1Gr, shall form, according to their applicability, a part of these specifications.

USE.—2. This wire shall be used for locking nuts and turnbuckles.

MATERIAL.—3. The wire shall be manufactured of either I.A.S.B. standard steel No. 1015 or No. 1020.

MANUFACTURE.—4. The wire shall be furnished in the soft-annealed condition, and shall be evenly and smoothly galvanised.

WORKMANSHIP AND FINISH.—5. The wire shall be cylindrical and smooth and must show no evidence of scrapes, splits, cold shuts, rough, or other defects.

PHYSICAL PROPERTIES AND TESTS.—6. The tensile strength must not exceed 75,000 lbs. per sq. in. (52.7 kg. sq. mm.).

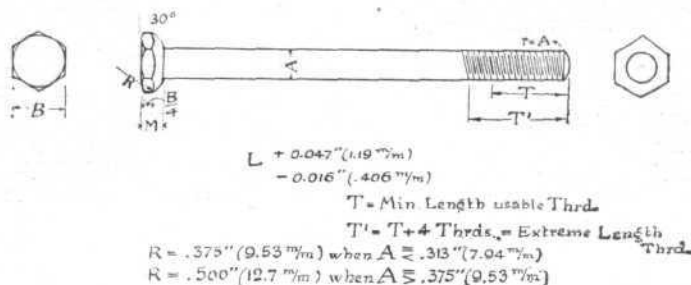


Fig. 1.

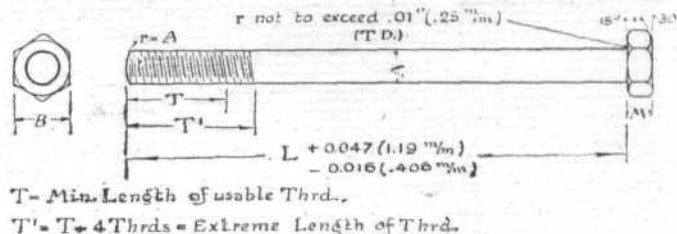


Fig. 2.

subjected to this test, the threaded portion must withstand being bent cold through 35 degrees.

One per cent. of each size of bolt shall be subjected to both the tensile and the bend test.

DIMENSIONS AND TOLERANCES.—6. The bolts shall be of the form shown in figures 1 and 2 and shall conform to the

TABLE 1.—DIMENSIONS AND TOLERANCES FOR PLAIN HEXAGON HEAD BOLTS.

Diameter.	Threads per inch.	A.—Pitch diameter.				B.	M.	Minimum breaking load.
		Maximum.	Minimum.	Maximum.	Minimum.			
in.		in.	in.	in.	in.	in.	in.	lbs.
0.164	32	0.164	0.160	0.1460	0.1440	0.312	0.125	1,170
0.190	32	0.190	0.186	0.1680	0.1660	0.375	0.125	1,630
0.216	32	0.216	0.212	0.1930	0.1910	0.375	0.125	2,240
0.250	28	0.250	0.246	0.2268	0.2248	0.437	0.156	3,130
0.312	24	0.312	0.308	0.2854	0.2833	0.500	0.188	3,070
0.375	24	0.375	0.371	0.3479	0.3457	0.562	0.219	7,860
0.437	20	0.437	0.433	0.4050	0.4027	0.687	0.250	10,610
0.500	20	0.500	0.496	0.4675	0.4651	0.750	0.281	14,510
mm.		mm.	mm.	mm.	mm.	mm.	mm.	kilos.
4.17	32	4.17	4.07	3.708	3.658	7.93	3.17	530
4.83	32	4.83	4.73	4.267	4.216	9.52	3.17	740
5.49	32	5.49	5.39	4.902	4.851	9.52	3.17	1,020
6.35	28	6.35	6.25	5.760	5.710	11.11	3.97	1,420
7.93	24	7.93	7.83	7.249	7.196	12.70	4.76	2,300
9.52	24	9.52	9.42	8.837	8.781	14.29	5.56	3,570
11.11	20	11.11	11.01	10.287	10.229	17.46	6.35	4,830
12.70	20	12.70	12.60	11.870	11.810	19.05	7.14	6,600

TABLE 2.—DIMENSIONS AND TOLERANCES FOR BALL HEXAGON HEAD BOLTS.

in.		in.		in.		in.		lbs.
0.164	32	0.164	0.160	0.1460	0.1440	0.312	0.172	1,170
0.190	32	0.190	0.186	0.1680	0.1660	0.375	0.172	1,630
0.216	32	0.216	0.212	0.1930	0.1910	0.375	0.172	2,240
0.250	28	0.250	0.246	0.2268	0.2248	0.437	0.203	3,130
0.312	24	0.312	0.308	0.2854	0.2833	0.500	0.250	5,070
0.375	24	0.375	0.371	0.3479	0.3457	0.562	0.313	7,860
0.437	20	0.437	0.433	0.4050	0.4027	0.685	0.359	10,610
0.500	20	0.500	0.496	0.4675	0.4651	0.750	0.375	14,510
mm.		mm.	mm.	mm.	mm.	mm.	mm.	kilos.
4.17	32	4.17	4.07	3.708	3.658	7.93	4.37	530
4.83	32	4.83	4.73	4.267	4.216	9.52	4.37	740
5.49	32	5.49	5.39	4.902	4.851	9.52	4.37	1,020
6.35	28	6.35	6.25	5.760	5.710	11.11	5.16	1,420
7.93	24	7.93	7.83	7.249	7.196	12.70	6.35	2,300
9.52	24	9.52	9.42	8.837	8.781	14.29	7.94	3,570
11.11	20	11.11	11.01	10.287	10.229	17.46	9.13	4,830
12.70	20	12.70	12.60	11.870	11.810	19.05	9.53	6,600

SELECTION OF TEST SPECIMENS.—7. When the wire is being unreeled to form small coils for shipment, specimens may be taken from the first, last and any intermediate coil in the presence of an inspector who shall seal the small coils. Otherwise specimens shall be taken from 10 per cent. of the coils for each size.

DIMENSIONS AND TOLERANCES.—8. (a) All wire for this purpose shall be furnished in decimal sizes corresponding to the American Wire Gauge (Brown and Sharpe gauge).

(b) A permissible variation of 0.002 in. (0.051 mm.) above gauge on all sizes will be accepted, but no wire will be accepted having a variation of more than 0.0005 in. (0.013 mm.) below gauge.

DELIVERY, PACKING, AND SHIPPING.—9. (a) Wire covered by this specification shall be shipped in coils or bundles wrapped closely with a layer of plain strong paper in strips no less than 3 ins. (76.2 mm.) wide and then covered with another wrapping of waterproof paper of an approved quality.

(b) The size and weight of packages or coils shall conform to the following unless otherwise specified on orders: 0.072 in. (1.828 mm.) and larger, mean diameter of coils 22 ins. (559 mm.), minimum weight of coil 25 lbs. (11.34 kg.); 0.064 in. (1.628 mm.) and smaller, mean diameter of coils 8 ins. (305 mm.), minimum weight of coil 10 lbs. (4.54 kg.).

INSPECTION AND REJECTION.—10. A tag supplied by the manufacturer and filled in by the Government inspector with ink, showing the number of the test as per his official list of tests, the diameter of the wire, and the breaking strength, shall be attached to each coil or piece of wire accepted by him or by the salvage board. Such tag shall be sealed on the bundle with a steel wire of approved design and a lead seal bearing the private mark of the inspector doing the work.

CHEMICAL COMPOSITION OF STANDARD CARBON STEELS.

Number.	Carbon.	Manganese.	Phosphorus, maximum.	Sulphur, maximum.
1015	0.10-0.20	0.30-0.60	0.045	0.050
1020	0.15-0.25	0.30-0.60	0.045	0.050

(To be continued.)

Another Zeppelin Lost?

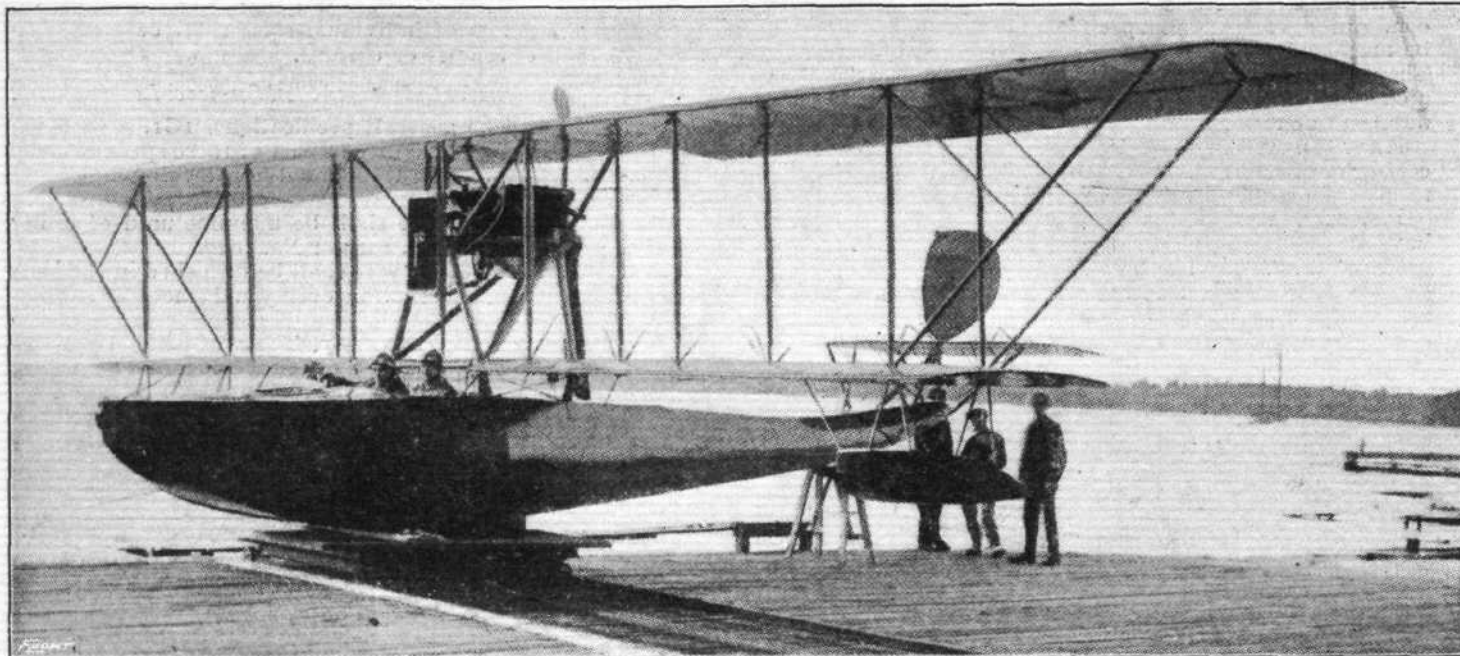
A MESSAGE from Stavanger to the Christiania journal *Tidens Tegn* reports that a Zeppelin was lost outside Jaederen in South-West Norway, apparently after having been shelled and hit by a British warship.

FROM OTHER LANDS.

THE F.B.A. FLYING BOAT.

WE are indebted to our American contemporary *Aerial Age* for the accompanying illustrations and scale drawings (passed by the U.S. censor) of the F.B.A. Flying Boat, which has been used with such great success by the Allies for over-water scouting and fighting.

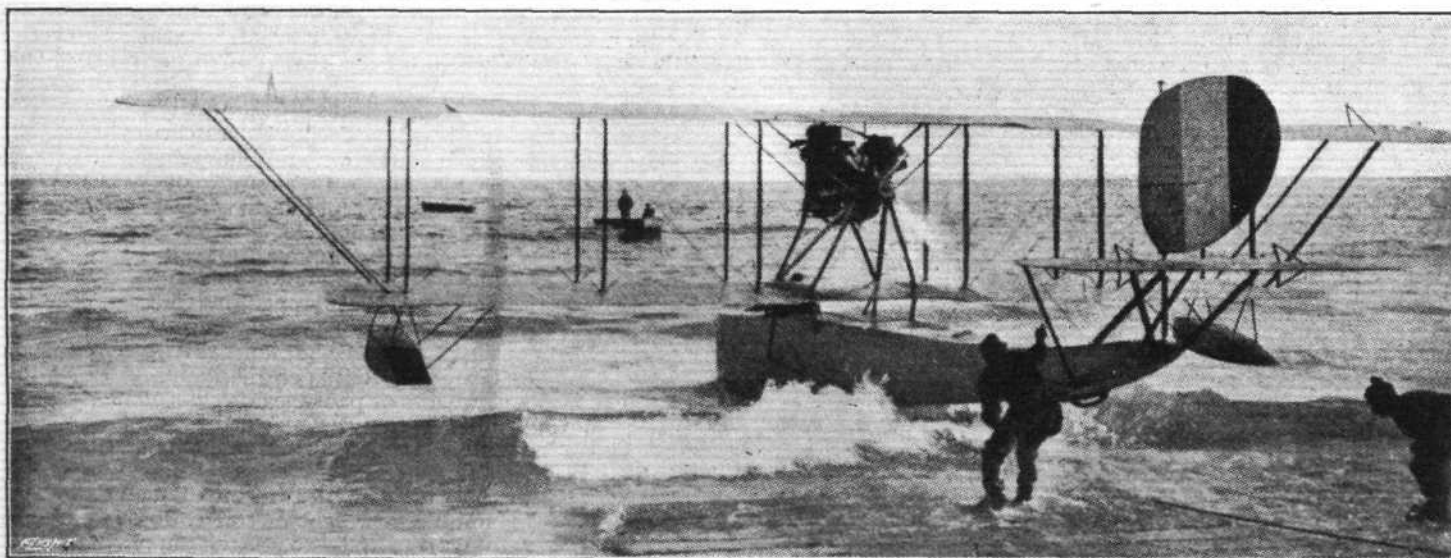
During the war various models of F.B.A. boats have been produced and employed by the Allies, more particularly France and Italy, and these machines, equipped with Gnome, Clerget, or more often Hispano-Suiza engines, have proved very efficient and speedy. The accompanying illustrations



Three-quarter rear view of the Hispano-Suiza-motored F.B.A. flying boat.

The Franco-British Aviation (Société Anonyme), Paris, was founded in 1914 by Lieut. Jean de Conneau, (André Beaumont, winner of the Paris Rome, Circuit-European, and Circuit-of-Britain races), and M. Schraeck of the French

and scale drawings show the model fitted with the 130 h.p. Hispano-Suiza as used by the French. The top plane has a span of about 46 ft. 6 ins., and a chord of 6 ft., whilst the span and chord of the lower plane are 35 ft. and 5 ft.



View from the rear of the Hispano-Suiza-motored F.B.A. flying boat.

Wright Co., to exploit the patents pertaining to the Donnet-Lévêque and Artois Flying Boats.

Two Gallant Rescues.

THE details which are now published of the services which won awards gazetted on November 26th last, show that two of them were for gallant assistance rendered to pilots:—

Bar to Military Cross.

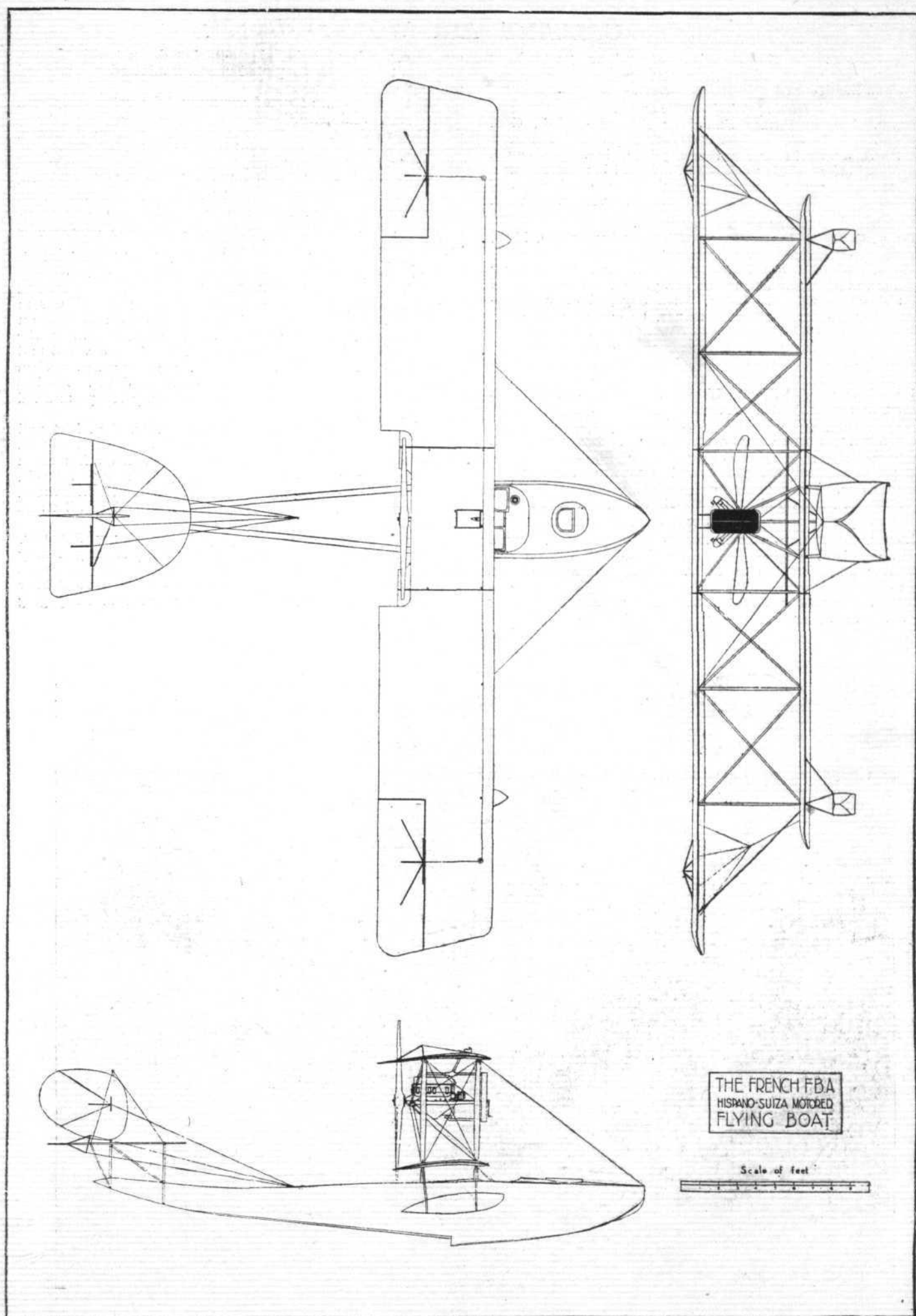
Lieut. (Acting Capt.) Frederick William Heath, M.C., Lond. R. For conspicuous gallantry and devotion to duty. One of our aeroplanes was brought down in "No Man's Land" about 400 yards in front of his position, and the pilot was reported to be in a shell hole badly wounded. He at once went out in daylight, under enemy rifle and machine gun fire, and crawled to within twenty yards of the pilot,

respectively. The gap between the planes is 5 ft. 9 ins., and the overall length of the machine is 32 ft. 6 ins.

when he was himself wounded. He found that the pilot was too badly wounded to be moved, and, promising that help would be sent, he then returned to our lines. He showed the greatest disregard of danger, and his action set a splendid example to all.

Military Cross.

Temp. Sub-Lieut. William Milton, R.N.V.R. For conspicuous gallantry and devotion to duty. When one of our aeroplanes landed in flames and turned over, making it impossible for the pilot to escape, he at once went out with some men under enemy shell fire, had the aeroplane turned over, put out the fire, and saved the pilot's life.



THE F.B.A. FLYING BOAT.—Plan, side and front elevations to scale.

GALLANT AIR WORK.

WITH reference to the awards conferred as gazetted on November 26th, the following are the statements of service for which the decorations were conferred:—

Distinguished Service Order.

Temp. Captain PHILIP FLETCHER FULLARD, M.C., Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty. As a patrol leader and scout pilot he is without equal. The moral effect of his presence in a patrol is most marked. He has now accounted for fourteen machines destroyed and eighteen driven down out of control in a little over four months.

Bar to Military Cross.

Temp. Captain HARRY GEORGE ERNEST LUCHFORD, M.C., Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty. When engaged on a patrol, he and his observer encountered about fifteen hostile aeroplanes, and shot one of them down in flames. Later, when engaged on a reconnaissance with three other machines, he encountered eight hostile aeroplanes, and shot one of them down. On another occasion he destroyed one of three hostile scouts which were attacking one of our machines, and also shot down a hostile two-seater.

Second Lieutenant (Temp. Lieut.) VICTOR RODNEY STOKES WHITE, South Staffordshire Regiment, Spec. Res., and R.F.C.—While acting as observer on an offensive patrol he and his pilot shot down an enemy scout in flames. Later, while on a reconnaissance with three other machines, he and his pilot engaged eight enemy aeroplanes, and shot down and destroyed one of them. On another occasion they destroyed one of three hostile scouts and also a hostile two-seater machine.

Military Cross.

Lieutenant (Temp. Capt.) DAVID SIDNEY HALL, Argyll and Sutherland Highlanders and R.F.C.—For conspicuous gallantry and devotion to duty. While leading back his formation of five machines from a bombing raid he was attacked on eight different occasions by numerous enemy scouts. He himself shot down one in flames and another

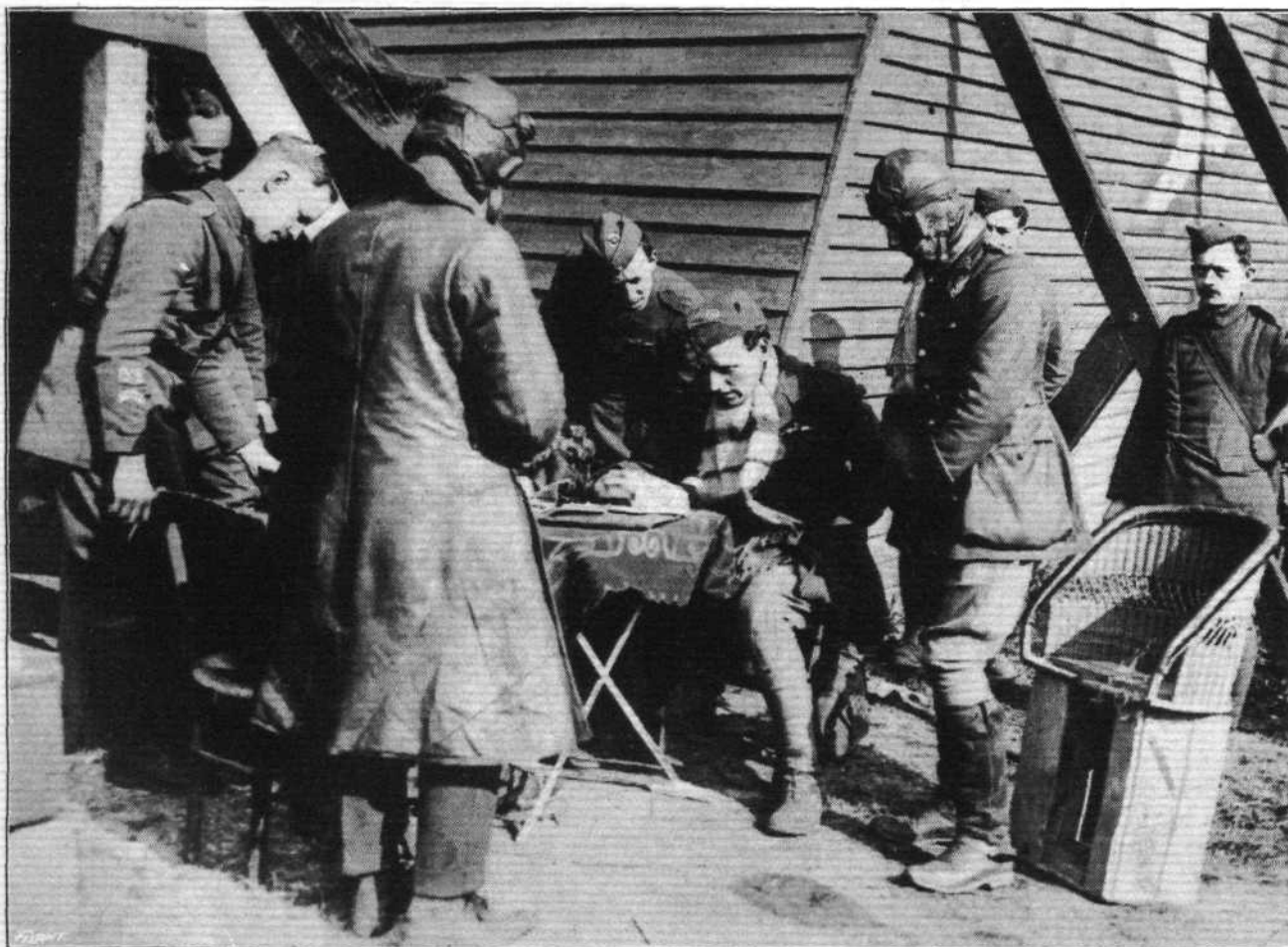
out of control, while his observer shot down two in flames. He has at all times completed the task allotted to him, and set a splendid example.

Captain FREDERIC HOPE LAWRENCE, Worcester Regiment, Spec. Res. and R.F.C.—For conspicuous gallantry and devotion to duty. While leading a patrol of eight scouts, which were protecting a number of bombing machines, he attacked ten enemy machines, driving one down in flames and preventing the bombing machines being interfered with. On another occasion he attacked five enemy scouts, bringing one down in flames. He has brought down two other machines, and has at all times shown the greatest coolness and courage.

Temp. Lieutenant JOHN SMITH MICHIE, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty. On one occasion he attacked a hostile two-seater machine while it was leaving the ground, and forced it to dive. He then from a height of 150 feet dropped his bombs on the machines on the aerodrome, destroying one. His machine was hit in the petrol tank, and touched the ground, but he recovered and led his patrol back safely. On another occasion he attacked three hostile scouts, bringing one of them down. He has also carried out numerous actions on enemy troops and led many patrols with great success.

Second Lieutenant JAMES DENNIS PAYNE, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty. While on patrol with two other scouts he attacked a formation of seven enemy two-seaters, bringing down two himself, while the two scouts brought down two more. Besides these, he has accounted for five other machines, and at all times shown the greatest gallantry.

Second Lieutenant (Temp. Capt.) FREDERICK SOWREY, D.S.O., Royal Fusiliers and R.F.C.—For conspicuous gallantry and devotion to duty in shooting down in less than two months two Albatros scouts and a Rumpler two-seater and a Fokker scout, and in two engagements flying very low and engaging and scattering hostile infantry.

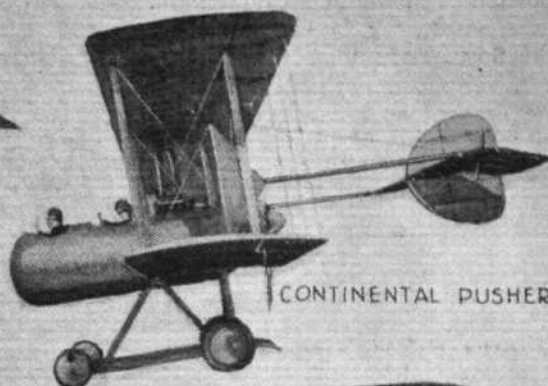


British Official.

Pilots bringing in their reports as to the positions of the enemy during the German offensive on the Western Front in France.



CURTISS "TWIN JN"



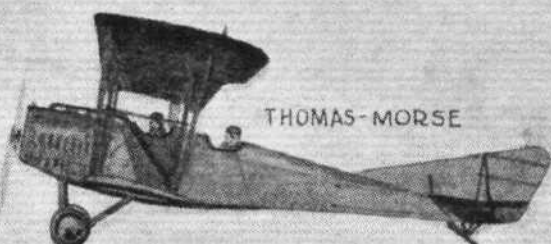
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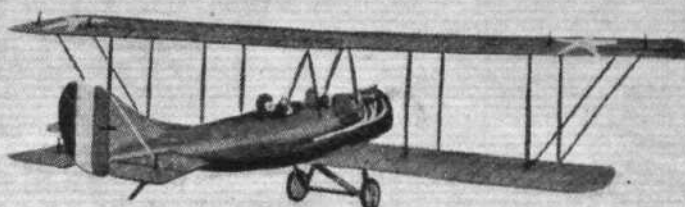
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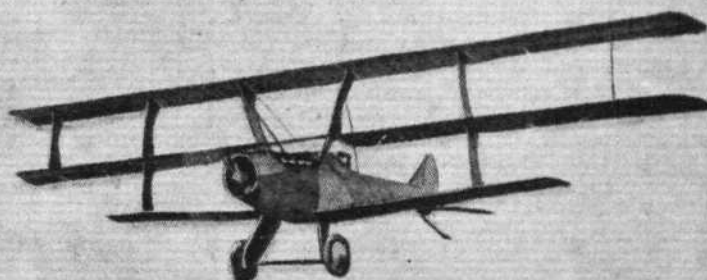
THOMAS-MORSE



L.W.F. TRACTOR



AEROMARINE



CURTISS TRIPLANE



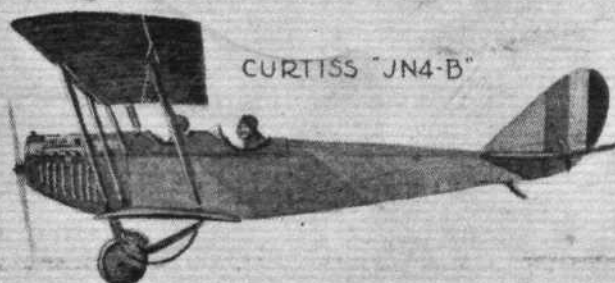
ORDNANCE ENGINEERING



STURTEVANT



WITTEMANN - LEWIS



CURTISS "JN4-B"

McLaughlin

their poisonous leanings create discontent altogether out of proportion to their numerical strength.

SOME TECHNICAL NOTES.—From *The Aileron*.

1. Never put more than 18 pints in sump, or machine will wobble.
2. Never fix prop on wrong way round, or machine will start stunting on its own.
3. Always ascertain the amount of petrol in the tank with the aid of a match.
4. If engine loses revs., drop another penny in the slot, sharp.
5. If an air leak occurs, fetch a plumber.
6. If misfiring occurs, fill mag. with shellac—this will make the spark stick.
7. If the engine is a dud, fit a Ford.
8. If engine drops out while flying, never get the "wind up," a D.H. 6 can fly on its reputation.
9. If engine is running rough, squirt carborundum paste down breather, this will smooth matters.

A NOTICE board bearing this inscription is exhibited on a road leading past a certain Lincolnshire aerodrome :—

LADIES AND GENTLEMEN ARE REQUESTED NOT TO THROW WASTE PAPER OVER THIS FENCE, AS IT TAKES THE TIME OF THE AIR MECHANICS TO PICK IT UP.

But surely *real* ladies and gentlemen would hardly do that kind of thing!

THROUGH Theodore Van der Linden, a Dutch engineer employed at Essen, in the *Washington Post*, another chapter in the story of the "gift" of the first Handley Page machine to the enemy is set out. Following this momentous event it appears the Kaiser, accompanied by the Crown Prince and Hindenburg, arrived quite suddenly at the Villa Hügel, it being obvious that some great move was afoot, and the writer determined if possible to fathom the mystery. Mr. Linden then sets forth his adventures thus :—

"Prolonged conferences were held at the Villa Hügel, and in all these General von Höppner participated. I learned the secret of their conferences as a result of the confidence of one of the overseers in the aeroplane department who was quartered with me. The man one evening told me with great glee of the capture by the Germans of a wonderful British aeroplane. He said that the machine had flown from England to France and had descended in error during a thick fog inside the German lines.

"Have you seen the machine, or is it only another fable?" I asked.

"Seen it?" said the man. "Why, it has been brought here and is now in one of the hangars. The Kaiser and others have inspected it closely."

"I expressed a wish to see this wonderful machine, and the overseer said it might easily be arranged."

"On the following day I actually saw the machine, in company with the overseer who had told me of it."

Continuing his story the author states :—"While we were examining the aeroplane I heard the sound as of motor-cars approaching, and, looking up, was surprised to see the Kaiser, Crown Prince, and others coming with Höppner and von Böhlen. The Kaiser and Crown Prince went aboard and all the details of control and the bomb-dropping apparatus were carefully explained to them. The War Lord took the pilot's seat, and turning to the Crown Prince, who was occupying the gunner's seat, said, 'A useful gift from our enemies. We can use it with good effect against them.'

"The Crown Prince agreed, and added, 'These will be the machines to destroy London.'

"After the two royalties had descended from the machine it was loaded with dummy bombs in preparation for a flight. The now famous German flying officer Richthofen took the seat which the Kaiser had vacated, and two other officers also boarded the plane. With a terrific roar the two engines were started, and like a bird the aeroplane rose in the air. It climbed rapidly to about 10,000 ft., and the Kaiser turned to General Höppner, saying :

"How is it that, at such a height and on so cold a morning, the lubricants do not freeze?"

"The British have discovered the secret which we have been seeking for months," replied the general. "Our great difficulty is now surmounted. It is a gift from Providence. Does it not show that God fights for us?"

"As the pilot in the exhibition flight manœuvred the machine, performing some wonderful feats, the excitement of the Kaiser was intense. Closely he watched the plane through his glasses, and during a sensational spiral dive, when it seemed that the machine must certainly crash to earth, so close was it to the ground, it darted upward again, almost on its tail.

"A few weeks later von Höppner was appointed head of the Imperial German Air Service. Krupps were kept busy constructing the powerful twin engines for these machines of death, while special plant was laid down in other towns and factories speeded up. It was well known in Essen and other places in Germany that in the early summer of 1917 a large fleet of these machines would be ready to commence operations against Britain. The production of Gothas of an improved



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British
Official.
On the
Western
Front in
France.—
Bringing
in a Ger-
man Scout
brought
down over
our lines
during the
German
offensive.

■ ■ ■ ■ ■



Captain John L. Trollope, R.F.C., who recently brought down six enemy machines in one day, and is now reported "Missing."

type was rapid. By June last it was stated that Germany possessed a fleet of 60."

ALREADY the American pilots are co-operating with the Allies in Europe, and that the liveliest participation in the fighting zone by the American flying service may be speedily looked for is more than a mere dream, is evidenced by Mr. Laurence Jerrold in a recent well balanced article in the *Daily Telegraph* upon the work of the American troops in France. Mr. Jerrold, in writing of the U.S. Air Force, states that perhaps the biggest work of all the Americans are doing is a certain aviation camp and school. In a few months it has neared completion, and when it is finished it will, I believe, be the biggest of its kind in the world. There pilots are trained, and trained in numbers which I may not say, but which are comforting. The number of aeroplanes they use merely for training, which also I must not state, is in itself remarkable. "Training pilots is the one essential thing," I was told by the C.O. These flying men—or boys—who have, of course, already been broken in in America, do an additional course in France, and when they leave the aviation camp I saw they are absolutely ready for air fighting at the front. This is the finishing school. The aviators go through eight distinct courses in this school. They are perfected in flying, in observation, in bombing, in machine-gun firing. On even a cloudy and windy day the air overhead buzzes with these young American flyers, all getting into the pink of condition to do their stunts at the front. They seemed to me as keen as our own flying men, and as well disciplined. They live in the camp, and it requires moving heaven and earth for one of them to get leave to go even to the nearest little quiet old town.

FOR long the claim of the late Capt. Ball, V.C., of the record of five enemy machines in one day to his credit has held good. Now simultaneously with the news of his being missing, the record must pass to Capt. J. L. Trollope, R.F.C., who during the day's duty accounted for no less than six Hun machines. A detailed recital of Capt. Trollope's remarkable work is given last Friday by the Special Correspondent of the *Times*

at the War Correspondents' Headquarters, when dealing with the Air Arm in the present great battle. Referring to the missing officer, he writes:—

"A few days before his failure to return this gallant officer performed the extraordinary feat of shooting down six enemy aeroplanes in a single day. I believe that Capt. Ball once shot down five, but this achievement of Capt. Trollope's constitutes undoubtedly a record. The details of his exploit are as follows:—

"Capt. Trollope was out with a formation when they saw four German fighting aeroplanes trying to interfere with some of our observing machines. Capt. Trollope attacked one of the enemy and fired into it from close range, when the German aeroplane fell all to bits in the air. The other three Germans scattered and got away, so, going on, Trollope soon espied two more enemy two-seaters below him, close to the ground. He dived at them and engaged them one after another, and both went down and crashed, the fighting being so low that in each case their striking the earth was clearly visible. Capt. Trollope then climbed up to rejoin his formation, which was again engaged with another party of the enemy. He entered the *melée*, and used up what ammunition he had left, and came home for more.

"Having replenished, Trollope started out again and met a party of three of the enemy trying to cross the battle line. He went for one of them, but his gun jammed, and he had to draw off till his gun got going again. Then he turned and attacked another of the enemy who was nearer than his original antagonist, fired into him at point-blank range, and the enemy went down spinning and then broke into pieces. Turning from his last victim, Capt. Trollope then went after the third of the enemy party, caught it up, attacked it, and the German broke into flames in the air. This made five of the enemy shot down in a single day, and Trollope turned for home. But on the way he saw another enemy scout attacking one of our slower machines. He went to the rescue and tackled the enemy, who went down spinning, and the other pilot saw it crash hopelessly into the ground. It was altogether a most brilliant performance, and that so gallant a man should now be missing will be a matter of universal regret."

"FLYING COLONELS." From the *Westminster Gazette*. Comment is needless.

"To the Editor of the 'Westminster Gazette.'"

"Sir.—I am not sure if I voice the opinion of the majority, but to my mind it shows an extraordinary want of imagination on the part of the person responsible that at this epoch, when an entirely new service is called into being, the officers of the Royal Air Force should be ordered to dub themselves 'Colonels,' 'Brigadiers,' &c., names which have no more connection with their duties than, say, that of Great Mogul.

"I leave to more fertile brains the solution of what, after all, is a problem of some importance, merely suggesting that 'Commander' is now a long-established English word, understandable of the multitude, and that, associated with variations such as 'Flight,' 'Wing,' and even 'Chief,' might supply what is required.—I am, Sir, yours faithfully,
"April 3. "FATHER OF A BOY WHO FLIES."

TEN YEARS AGO.

Excerpts from the "Auto." ("FLIGHT's" precursor and sister Journal) of April, 1908. "FLIGHT" was founded at the latter end of 1908.

AEROPLANE FLIGHT IN AMERICA.

A trial was recently carried out in America by the Aerial Experiment Association—a body formed in 1907 by Dr. Alexander Graham Bell—with a double decked machine, which resulted satisfactorily in a flight of 318 ft. at a height of about 15 ft. above the ground. The experiment took place on the ice-bound Lake Keuka, near Hammondsport, N.Y., on the 12th of last month. The present machine is somewhat peculiar in that the super-posed surfaces converge towards one another at their extremities, the convergence being gradual and continuous from the centre, so that viewed from in front the outline takes an elongated elliptic form; the extremities do not, of course, meet. The upper surface overlaps the lower, the total spread being 43 ft., and the total supporting surface of both planes together being 385 sq. ft., of which about 100 sq. ft. is made up of the flexible posterior edges with which the aeroplane surfaces proper are fitted. The weight of the machine fully equipped is 385 lbs., of which 185 lbs. represents the weight of the machine alone, and 200 lbs. that of the engine, propeller, fuel, oil, &c. On the occasion of the initial flight the aeronaut—Mr. F. W. Baldwin—weighed 185 lbs., thus bringing up the total weight to 570 lbs., which is equivalent to 1.48 lbs. per square foot of supporting surface. With this load the machine rose, it is stated, at 25 miles an hour, after a preliminary run over the ice of 200 ft.

PERSONALS

Casualties.

Lieutenant SIDNEY COLLIER, M.C., Manchester Regiment, attached R.F.C. was the youngest son of the Rev. and Mrs. S. F. Collier, of the Olives, Victoria Park, Manchester, and was killed in France in a fight in the air. He enlisted in September, 1914, in the Manchester Regiment, obtained a commission in October of the same year, went to Egypt in April, 1915, and fought through the Gallipoli campaign, in which he was wounded, and in which he obtained the Military Cross for gallant conduct in the field, and was also twice mentioned in despatches. After the evacuation of Gallipoli he was on the Palestine front for a short time, returning with his regiment to France last year. A few months ago he joined the R.F.C., and after a brief training in England returned to France in March this year. He was 22 years of age.

Flight Sub-Lieutenant GODFREY JOHN WHITEHOUSE GOODWIN, R.N., who was killed on active service on March 12th, aged 20, was the eldest son of Mr. and Mrs. John G. Goodwin, Rockside, Matlock.

Lieutenant ERIC DUNCAN GRANT, Australian F.C., who was killed in a flying accident on April 4th, was 20 years of age, and eldest son of the late Alexander Grant, of Melbourne, Victoria, and of Mrs. Alexander Grant, of Cromwell Road, S.W.

Captain D. D. G. HALL, M.C., Yorkshire Regiment, who died of wounds received while flying on March 26th, was son of Mrs. Upton Gaskell, and was twenty-three years of age. He obtained his commission in May, 1915, and was appointed temporary captain in July, 1917, when he received the rank of Flight Commander in the Air Service. He had served with distinction, and had been awarded the Military Cross.

Second Lieutenant CLIFFORD RICHARD BRICE HALLEY, Pilot, R.F.C., who was reported missing on Oct. 2nd, 1917, and now officially reported killed in action on that day was the only son of Mrs. Brice Halley, "Nut Hall," Avenue Road, Crouch End, and of the late James Brice Halley, formerly of 15, Finsbury Circus, E.C. His age was 19.

Lieutenant EVAN DAVIES JONES, R.F.C., who was killed in action on April 2nd, was aged twenty-five and the youngest son of Sir Evan Jones, of Pentower, Fishguard, Pembrokeshire, and Addison Road. He was educated at Haileybury and Trinity College, Cambridge, graduating B.A. in 1915, and taking the degree of M.A. in January in this year. He was commissioned in the Royal Fusiliers on August 14th, 1914, and subsequently transferred to the R.F.C., obtaining his pilot's certificate in September, 1917.

Captain DOUGLAS STEWART KENNEDY, M.C., R.F.C., who was previously reported missing on the 12th of March, and now reported killed in action, was the younger son of Mr. and Mrs. James Kennedy, Craigmore, Broughty Ferry.

Second Lieutenant JOHN DRUMMOND WYATT-SMITH, General List and R.F.C., who was killed on March 17th, aged 19, was the second son of Mr. and Mrs. R. Wyatt-Smith, of Gunton, O.R.C., South Africa, and Church House, Merrow. He was educated at Packwood Haugh and at Sherborne School, where he was a school prefect, head of his house, cadet officer, in the football XV., and captain of the XI., playing at Lord's last summer for the Public Schools. He joined the R.F.C. in August and obtained his wings early this year. He had only been a few days at the front. His elder brother, H. H. Wyatt-Smith, died of appendicitis in 1916, while serving with the Artists' Rifles.

Captain S. P. GAMON, Cheshire Regiment and R.F.C., who was killed accidentally while flying on March 23rd, was the eldest son of Mr. and Mrs. J. P. Gamon, of Leighton Banastre, Parkgate, Cheshire, and was 23 years old. He was educated at St. Fillan's Heswall, The Leas, Hoylake, and Uppingham School. An application for entrance into the R.N.A.S. which he made in August, 1914, was refused, as he then held a commission in a Territorial Force as officer commanding the machine-gun section. This section was chiefly manned by men from the Chester Hydraulic Engineering Company, with whom he was completing a course of engineering, and he went to the front with his regiment in February, 1915, remaining with them there till May, 1916, and having during

that time gained the permanent rank of captain. He then obtained leave to join the R.F.C., and was acting as observer in France from May to November, 1916, when he returned to England to take his pilot's course. Obtaining his wings early in 1917, he had since been engaged in the aerial defence of London.

Captain CECIL PHILIP GEORGE GORDON, South Staffordshire Regiment, attached R.F.C., who was accidentally killed while flying in Gloucestershire on March 21st, aged 24, was the only son of Colonel Philip Cecil Harcourt Gordon, Army Medical Corps.

Captain MAURICE DUGLAS GUEST-SCOTT, M.C., R.F.C., who died on March 17th in Sussex as the result of a flying accident, was the only surviving child of the late Philip Guest-Scott, District Engineer, E.I.R., India, and of Mrs. Guest-Scott. His age was 22.

Lieutenant EDMUND SYDNEY HOWELLS, R.F.C., who was killed accidentally, while acting as flying instructor, on March 27th, was the eldest son of the Rev. E. Howells, B.D., vicar of Milford Haven. He was educated at the King's School, Worcester, where he represented the school on the river, and was passing from the sixth form to Oxford when the war broke out. He received a commission in the Welsh Regiment directly from the O.T.C., and served with it in France, being wounded in 1916. On recovery he returned to his regiment on another front, where he was transferred to the R.F.C., and served for some time in Egypt. Last year he was recalled to act as instructor at home.

Captain FRANCIS REGINALD HUDSON, R.F.C., who was killed by accident while flying on March 21st, aged 27, was the son of the Rev. A. R. Hudson, Rector of Huntsham, Devon.

Second Lieutenant ERNEST GRAHAM HUMPHREY, R.F.C., who died of wounds on March 29th, aged 21, was the son of the late Rev. W. J. Humphrey, formerly Principal of Fourah Bay College, Sierra Leone, and of Mrs. Humphrey, of 23, Hereford Road, Acton, W. He was educated at Bedford Modern School, where he gained both entrance and leaving exhibitions. In October, 1914, he entered the City and Guilds (Engineering) College, South Kensington, and passed the intermediate B.Sc. (Engineering) Examination of London University in the following year. He joined the O.T.C. at school, transferred to the Senior Division at Kensington, and in 1915 obtained a commission in the South Staffordshire Regiment. In July, 1916, he was sent to France, and subsequently, at his own request, was attached to the R.F.C. as an observer. He had been wounded on two previous occasions.

Probationary Flight Officer ALAN VESTY JONES, R.N.A.S., who was killed in an aeroplane accident in Lincolnshire on March 23rd, aged 19, was the second son of Mr. and Mrs. David D. Jones, "Strathleven," Oakleigh Park, London, N.

Second Lieutenant H. F. LAY, R.F.C., who was killed in a flying accident in France on March 7th at the age of 19, was the son of M. M. Lay, of Upper Holloway. He was educated at Hackney Institute, having won the Trade Scholarship, and went to the Grahame-White Aviation Co., as draughtsman. He joined the R.F.C. on June 6th, 1917, and received his wings in January last. He was a test and ferry pilot while in France.

Flight Sub-Lieutenant NORMAN MALLARD, R.N.A.S., who was drowned on April 6th whilst flying off the south-east coast, was the only surviving son of Mrs. Mallard, of Westcroft, Ilkley, Yorks. Educated at Christ's Hospital, he joined the R.N.A.S. last July, on his 18th birthday, and was gazetted four months later.

Captain EDWARD FRASER NORRIS, R.F.C., who was killed whilst flying at Oxford on March 15th, aged 22, was the only son of the late Lieut.-Colonel E. E. Norris, R.F.A., and Mrs. Norris, of Harrow Weald.

Second Lieutenant DUDLEY A. PAGE, Cheshire Regiment and R.F.C., who was missing and is now reported as having died of wounds on August 14th last, while a prisoner of war, was the younger son of the late Mr. Arthur Page and Mrs. Page, 140, Hill Lane, Southampton.



Second Lieutenant LESLIE GORDON SYKES, R.F.A., attached R.F.C., who died on March 22nd, as the result of a flying accident, was the only son of Mrs. H. H. Sykes and the late Lieut.-Col. H. H. Sykes, V.D., of Briarcourt, Lindley, Huddersfield.

Flight Commander Captain LESLIE VERNON THOROWGOOD, R.F.C., who died on March 22nd as the result of an accident, aged 23, was the only son of Mr. and Mrs. Arthur F. Thorowgood.

Lieutenant ERNEST W. TREGARTHEN, Royal Welsh Fus., attached R.F.C., who was accidentally killed while flying on March 18th, was the son of the late Mrs. Tregarthen, of Westville Road, Cardiff, was 30 years of age, and was formerly with Messrs. Hull, Blyth and Co., of the Docks, Cardiff. While with them he became an associate of the Secretaries' Institute, and he was working for his final examination when he joined the Inns of Court in November, 1915. The body was taken to Cardiff for burial, and the funeral service was held at the Roath Park Wesleyan Church, where Lieutenant Tregarthen had been a member and worker in Church and Sunday School from boyhood.

Captain ALBERT HIGGS VINSON, R.F.C., who died on March 22nd, aged 21, was the elder son of Albert Vinson, J.P., Parsonage Farm, Belvedere, Kent.

Second Lieutenant CHARLES HERBERT WHELOCK, R.F.C., who was killed on March 19th as the result of an aeroplane accident, was the son of Mr. and Mrs. C. R. Wheelock, Orangeville, Ontario, Canada.

Missing.

Lieutenant MAURICE EDWARD MEALING, M.C., R.F.C., reported missing, is the eldest son of Mr. and Mrs. Arthur Mealing, of Abercromby Avenue, High Wycombe. He was serving in the ranks of the Bucks Territorials when that battalion was mobilised at the outbreak of war, but after service in France was recommended for a commission in the Shropshire Light Infantry in May, 1916, but transferred to the R.F.C. the following October. Lieutenant Mealing had been awarded the Military Cross for destroying enemy aircraft, his official total being eleven aeroplanes and two balloons. During the recent German offensive his C.O. reports that he behaved with the utmost gallantry, bombing a German troop train and firing into enemy troops, in addition to bringing down hostile aeroplanes.

Married.

On April 3rd, 1918, at Holy Trinity Church, Leamington, Major LIONEL THOMAS NUTCOMBE GOULD, M.C., R.A.F., eldest son of Lionel F. Gould, of The Gable House, Bilton, Warwickshire, was married to BARBARA HARRIET, only daughter of CHARLES F. D. SPERLING, of Beresford House, Leamington.

On April 2nd, at the Catholic Apostolic Church, Camberwell, Captain JOHN SPENCER GREEN, M.C., R.A.F., eldest son of Mr. and Mrs. E. S. Green, of Herne Hill, was married to BEATRICE LOUISE, eldest daughter of Mr. and Mrs. E. A. ROSKILLY, of Forest Hill.

The marriage of Lieutenant FRANCIS RICHARD JOHNSON, R.F.C., son of the late Canon and Mrs. Johnson, of Cadbury, Co. Kildare, to PHYLLIS MARY, youngest daughter of the Rev. A. D. and Mrs. WILKINSON, Cumnor Vicarage, Oxford, took place on March 28th at Cumnor Church.

On April 2nd, at St. John the Evangelist, Edinburgh, Captain ALEXANDER F. LIVINGSTONE, R.A.F., eldest son of the late Frederick Livingstone, and Mrs. Livingstone, 33, Queensborough Terrace, Hyde Park, was married to JEANETTE MARGARET GRAHAM, younger daughter of ALEXANDER H. COOPER, W.S., 54, Manor Place, Edinburgh, and West Glenturret, Perthshire, and the late Mrs. Cooper.

Recruiting for the Penguins.

RECRUITING is now in progress for the Women's Royal Air Force popularly known as the "Penguins." The force will consist of officers, subordinate officers and members. There are two classes of members. Immobile members will live in their own homes, and will receive an allowance in lieu of food and lodging in addition to the fixed rate of pay. "Mobile" members, on the other hand, must be prepared to go to (a) any part of the United Kingdom; or (b) any part of the United Kingdom or overseas, according to the terms of their enrolment, and will be boarded and lodged in Royal Air Force quarters.

The main categories of employment are four—clerical, household, technical and general. There is room for every variety of clerk, and the need is specially felt in London, and at Stamford, Birmingham, Lincoln, Oxford, York, Grant-

On March 27th, at Bembridge, I.W., Flight Commander CLARENCE MACLAURIN, of Quebec, Canada, was married, to FRANCES LUISA (PITITA) GOODALL, only daughter of Mr. and Mrs. J. M. GOODALL, The Nest, Bembridge, I.W.

On April 2nd, at the Parish Church, Prestwich, Captain ROGER HENRY GARTSIDE NEVILLE, M.C., R.A.F., elder son of Ernest G. Neville, of Hampstead, was married to MARION ALDYTH CHORLTON, eldest daughter of Mr. and Mrs. A. E. CHORLTON, of Prestwich Park.

Captain FRANK PILKINGTON SCOTT, R.F.C., was married to OSYTH, youngest daughter of the late WILLIAM HERVEY, on April 2nd, at Selbourne Parish Church.

On April 3rd, at the Parish Church, Preston, Lancashire, Captain JOHN STANDEN SHAW, R.F.C., eldest son of Mr. and Mrs. Shaw, Royal Cross School, Preston, was married to GLADYS KATHLEEN, second daughter of Mr. and Mrs. LAWSON, Latham House, Preston.

On April 4th, at St. George's, Hanover Square, Captain WILLIAM DONSTON WAIN, R.A.F., was married to NESTA SYBIL, daughter of the late ROBERT FORREST and Mrs. Forrest, New Court, Marlow, Bucks.

To be Married.

The engagement is announced of Lieutenant R. H. DAVISON, R.F.C., only son of Mr. and Mrs. H. Davison, Toronto, Canada, and LILLIAN, daughter of Mr. and Mrs. E. T. POLKINGHORNE, 55, Glenmore Road, Hampstead, N.W.

The engagement is announced between Captain J. W. THOMSON GLOVER, Indian Infantry, attached R.F.C., son of the late David Thomson Glover, and Mrs. Thomson Glover, Richmond, Surrey, and CICELY PHYLLIS, daughter of Mr. and Mrs. F. B. SUMMERS, Froyle Place, Alton, Hants.

A marriage has been arranged between Lieutenant GEORGE W. M. GROVER, R.A.F., only child of the late George Grover and Mrs. P. Samuelson, and JOSEPHINE W. (JOAN) PATTERSON, twin daughter of Mr. and Mrs. W. R. Patterson, of Sorrento Lodge, Ryde, lately of 40, Cleveland Square, Hyde Park, London.

The marriage arranged between Lieutenant ARNOLD HUNT, R.F.C., son of Mrs. John Hunt, and NANCY DOREEN, daughter of the Rev. C. C. WEEKS, captain, R.A.M.C., and Mrs. Weeks, and granddaughter of the late Rear-Admiral Weeks, R.N., will take place at St. Hilda's, Crofton Park, on April 27th, at 2.30.

The marriage arranged between Captain FRANK NICHOL, M.C., Loyal North Lancs. and R.F.C., youngest son of Dr. and Mrs. Nichol, of 1, Ethelbert Crescent, Margate, and BUDDIE, younger daughter of Mr. and Mrs. GELLATLY, of Margate, will take place at St. Paul's Church, Margate, on April 20th, at 1.30.

The marriage arranged between Squadron Commander C. H. CHICHESTER SMITH, D.S.C., R.N., and Miss CUBITT will take place, leave permitting, on April 17th, at St. Andrew's Church, Bacton, Norfolk.

Items.

At Golders Green the cremation took place on March 28th of 2nd Lieutenant Instructor LUIGI G. COSTA, R.F.C., whose death was the result of an aeroplane accident in Norfolk on the 19th inst. In addition to relatives, representatives of the Italian Embassy attended, and the squad with which the late officer was connected was represented by Lieutenant Wright, 2nd Lieutenant Reed, and others. The coffin was covered with the Italian and British flags.

The will of the late Mr. HENRY THOMAS TUBBS, of Messrs. Tubbs, Lewis and Co., Noble Street, E.C., has been proved at £269,936 gross.

ham, Salisbury, and Glasgow. The domestic section comprises cooks, waitresses, laundresses, and general domestic workers, and for these there will be a steady demand for the messes of Air Force officers and men and for those of the "Penguins" quarters. The technical section offers great variety of employment, ranging from motor driving and motor cycling to different branches of aeroplane repair. Photographers, tracers, colourists, fabric workers, metal workers, fitters, and aeroplane riggers can all be usefully employed. The general section includes storehouse women, tailors, shoemakers, and others.

Only immobile members are being recruited at present, and particulars regarding rates of pay and conditions of service can be obtained from any employment exchange. Candidates for posts as officers should apply to the W.R.A.F. Inquiry Office, 9-13, Wellington Street, Strand, W.C.



The British Air Service



"PER ARDUA AD ASTRA"

The Royal Air Force.

London Gazette Supplement, April 5th.

The following appointments are made at the Air Ministry:—
S.O., 1st Class.—The notification in the *Gazette* of April 2nd, 1918, concerning Lieut.-Col. F. H. Kirby, V.C., is cancelled.
S.O., 2nd Class.—Maj. Hon. M. Baring, Capt. (Temp. Maj.) Rt. Hon. Sir J. A. Simon, K.C.V.O.; April 1st.
S.O., 3rd Class.—Lieut. (Temp. Capt.) W. P. Groves; April 1st. The rank of Capt. C. F. O. Master is as now described, and not as in the *Gazette* of April 2nd.

Memoranda.—Col. C. L. Lambe, C.M.G., D.S.O., to be Temp. Brig.-Gen. whilst commanding a Brig.; April 1st.
 J. de M. Hutchison, C.V.O., C.M.G. (Vice-Admiral, R.N.), to be Temp. Col., with the hon. rank of Lieut.-Genl.; April 1st.

Royal Flying Corps (Military Wing).

London Gazette Supplement, April 2nd.

The following appointments are made:—
Flying Officers.—Temp. Lieut. J. C. Cantrill, Gen. List; Dec. 19th, 1916. Lieut. C. P. Thurstby, Manitoba R., Canadian Exped. Force; Feb. 25th. Temp. 2nd Lieut. (on prob.), Gen. List, and to be confirmed in their rank:—R. Stone; Feb. 5th. C. M. McClean; Feb. 17th. S. C. J. Askin; Feb. 23rd. W. L. Andrew, C. B. Bateman; Feb. 25th.

Flying Officers (Observers).—Temp. Lieut. J. L. Smith, M.C., York R., seniority Aug. 30th, 1917, and to be transf'd. to R.F.C. Gen. List; 2nd Lieut. C. Wigglesworth, E. York R. (T.F.), seniority from Sept. 6th, 1917, and to be sec'd.; Feb. 28th. 2nd Lieut. P. S. Williams, Lond. R. (T.F.), and to be sec'd.; March 1st, seniority from Dec. 5th, 1917. Lieut. T. S. Blair, R.F.A., S.R.; Feb. 28th, seniority from Dec. 6th, 1917. Temp. 2nd Lieut. A. Bechevaise, Rif. Brig., and to be transf'd. to R.F.C. Gen. List; March 1st, seniority from Dec. 17th, 1917. And to be transf'd. to R.F.C. Gen. List; March 3rd, seniority from Dec. 30th, 1917. Temp. Lieut. R. W. Briggs, Lan. Fus., Temp. 2nd Lieut. B. Martin, R. Berks R., Temp. 2nd Lieut. A. Warren, Leic. R. (since killed in action). Temp. 2nd Lieut. (on prob.), Gen. List, and to be confirmed in their rank:—J. L. Rowe; Dec. 14th, 1917, seniority from Sept. 19th, 1917; D. A. S. Stevens (since killed in action); March 1st, seniority from Oct. 18th, 1917.

General List.—Temp. 2nd Lieut. R. V. Waters relinquishes his commission on account of ill-health contracted on active service, and is granted the hon. rank of 2nd Lieut.; April 3rd. 2nd Lieut. G. E. Blake, from R. Def. Corps (T.F.), to be Temp. 2nd Lieut.; March 16th. Temp. Sgt.-Major H. Jones, from R.F.C., to be Temp. 2nd Lieut.; March 31st.

London Gazette Supplement, April 3rd.

Special Appointments.
 Graded for purposes of pay as Staff Lieuts, 3rd Cl.—Temp. 2nd Lieut. (on prob.) H. A. I. Bosanquet, R.F.C., Gen. List; March 4th.
Supplementary to Regular Corps.—The notification in the *Gazette* of Sept. 14th, 1917, regarding 2nd Lieut. A. O. K. Wright is cancelled.
 A. O. K. Wright to be Lieut.; Jan. 7th, 1915 (substituted for the notification in the *Gazette* of April 18th, 1916).
 2nd Lieut. (on prob.) W. G. M. Browne is confirmed in rank.

London Gazette Supplement, April 5th.

Special Appointments.—(Graded for purposes of pay as Staff Lieuts, 3rd Class.)—Temp. 2nd Lieut. H. G. Thompson, R.F.C., and to be transf'd. to Gen. List; Jan. 25th.

The following appointments are made:—
Flight Commanders.—From Flying Officers, and to be Temp. Capt. while so employed:—Temp. 2nd Lieut., Gen. List, H. B. Bell; Feb. 23rd. P. Carpenter, M.C., P. Wilson; Feb. 27th.

Flying Officers.—Temp. 2nd Lieut. T. Aitken, attd. Sco. Rif., and to be transf'd. to R.F.C., Gen. List; Dec. 26th, 1917. Temp. Capt. E. C. Fernandes-Ferreira, Garr. Bn., Sea. Highrs., and to be transf'd. to R.F.C., Gen. List; Jan. 20th. 2nd Lieut. G. C. Huggard, Oxf. and Bucks. L.I., and to be sec'd.; Jan. 21st. Temp. Lieut. J. H. Langdon, M.C., Glouc. R., and to be transf'd. to R.F.C., Gen. List; Jan. 22nd. Lieut. F. J. Unwin, Shrops. L.I., S.R., and to be sec'd.; Temp. Lieut. W. N. Tolfree, attd. N. Staffs R., and to be transf'd. to R.F.C., Gen. List; Jan. 24th. 2nd Lieut. W. G. M. Browne, S.R.; Feb. 14th. Temp. 2nd Lieut. H. G. W. Lock, Gen. List, from an Equipment Officer, 3rd Class; Feb. 23rd. From Flying Officers (Observers); Feb. 24th.—Temp. Lieut. J. A. Aincow, Gen. List, seniority from Oct. 17th, 1916; 2nd Lieut. F. C. Penny, S.R., seniority from May 10th, 1917. Lieut. J. A. Dickie, Canadian A.M.C.; Feb. 26th; Lieut. L. C. Davies, M.C., Sco. Rif. (T.F.), from a Flying Officer (Obs.), seniority from Feb. 9th, 1917; Lieut. P. Waters, Quebec R., Canadian Exped. Force; Lieut. H. C. Young, Canadian M.G. Corps; Feb. 27th. 2nd Lieut. G. W. Heenan, L'pool R. (T.F.), and to be sec'd.; 2nd Lieut. F. H. Marsh, Herts R. (T.F.), and to be sec'd.; Feb. 28th. Temp. 2nd Lieut. (on prob.), Gen. List, and to be confirmed in their rank:—A. C. Hardy; Jan. 7th; W. E. Sinclair; Jan. 18th. D. M. Darroch; Jan. 19th. C. A. Vick, M. E. Jones, S. F. Woods; Jan. 20th. C. H. Harrison; Jan. 21st. S. F. Baker, G. C. Mumford, J. Beattie, W. H. Oatley; Jan. 22nd. G. M. Metcalfe; Jan. 23rd. N. Bruce; Feb. 24th. V. A. J. Clark; Feb. 26th. C. Foster; Feb. 27th. H. L. Northey, H. P. Chubb, W. E. Clarkson, M. E. Bradley, R. L. J. Davies, W. R. May, F. Gibbons, A. T. McKay, T. F. X. Smallwood, J. A. Harkin, R. H. Hemmens, C. H. Wheelock; Feb. 28th. D. N. Dickson, H. R. T. Hughes; March 1st. Lieut. (Temp. Capt.) F. McQuistan, R.F.A. (T.F.), reverts from a Flight Comdr. and relinquishes his temp. rank; March 8th, seniority from June 26th, 1916. The appointment of Temp. 2nd Lieut. B. I. Johnstone, Gen. List, notified in the *Gazette* of Feb. 15th, is antedated to Sept. 1st, 1917.

Flying Officers (Observers).—Lieut. D. P. Hadow, M.C., North'd Fus., S.R., seniority from July 18th, 1917, and to be sec'd.; 2nd Lieut. J. R. Bond, Devon R. (T.F.), seniority from Sept. 2nd, 1917, and to be sec'd.; seniority from Oct. 2nd, 1917.—2nd Lieut. L. W. Mather, North'd Fus. (T.F.), and to be sec'd.; Temp. 2nd Lieut. C. A. Jefferson, L'pool R., and to be transf'd. to R.F.C., Gen. List; Temp. Lieut. E. C. Musson, Essex R., seniority from Oct. 3rd, 1917, and to be transf'd. to R.F.C., Gen. List; Temp. Lieut. (on prob.), Gen. List, and to be confirmed in their rank:—J. F. W. Nicolson, seniority from Sept. 2nd, 1917; W. E. McLean, seniority from Oct. 15th, 1917; A. Fielding-Clarke; Feb. 8th, seniority from Nov. 4th, 1917; (Nov. 15th, 1917).

Balloon Commander.—Graded as a Balloon Officer.—Temp. 2nd Lieut. C. G. Slade, General List, from a Balloon Officer, and to be Temp. Lieut. while so employed; Jan. 29th.

Adjutant.—Capt. C. V. Mercer, E. Kent R., S.R., from March 15th to Dec. 18th, 1917.

Equipment Officer, 3rd Class.—Temp. 2nd Lieut. E. Tyler, attd. D. of Corn. L.I., and to be transf'd. to R.F.C. Gen. List; Feb. 27th. Lieut. L. Watman, Lan. Fus. (T.F.), and to be sec'd.; March 2nd. Temp. 2nd Lieut. (on prob.), Gen. List, and to be confirmed in their rank:—B. F. Warburton; Nov. 15th, 1917. P. A. Edmonds; Dec. 3rd, 1917. G. A. Tandy; Jan. 1st. A. T. Williams; Feb. 1st. G. Betts; Feb. 16th. C. Rapley; March 1st.

General List.—To be Temp. 2nd Lieut. 1st Class Air Mech. S. F. Woods,

from R.F.C.; Dec. 7th, 1917. Pte. D. D. MacA. Eastwood, from A.S.C.; Dec. 9th, 1917. Cpl. J. Beattie, from R. Scots (T.F.); 1st Class Air Mech. E. G. Amatt, from R.F.C.; Dec. 15th, 1917. 2nd Corpl. W. H. Oatley, from R.E. (T.F.); Dec. 16th, 1917. Actg. Sergt. L. Wycherley, from Shrops. L.I. (T.F.); Pte. G. D. Longfellow, from Suff. R.; Dec. 18th, 1917. Corpl. W. C. Perry, from A.S.C.; Gnr. H. Garnett, from M.G. Corps (Motor); 1st Class Air Mech. C. Oxberry, from R.F.C.; Dec. 20th, 1917. Sergt. J. G. Gore, from R.A.M.C.; Pte. J. Maitland, from A.S.C.; Flt.-Sergt. J. Hogan, from R.F.C.; Dec. 20th, 1917. Actg. L'ce-Corpl. J. H. Windsor, from Shrops. L.I. (T.F.); Dec. 27th, 1917. Actg. Bombr. H. C. Wiggins, from M.G. Corps (Motor); L'ce-Corpl. W. Urinowski, from Ches. R. (T.F.); Dec. 28th, 1917. Actg. Corpl. H. S. Harris, from M.G. Corps (Motor); Dec. 29th, 1917. Corpl. S. N. Menzies, from R.E. (T.F.); Dec. 30th, 1917. L'ce-Corpl. R. Hall, from North'd Fus.; Corpl. A. V. Street, from R.E.; Dec. 31st, 1917. Pte. G. M. Metcalfe, from Yeo. (T.F.); Dec. 31st, 1917. Temp. Sergt.-Maj. C. A. Cordeaux, from R.F.C.; March 11th. Cadets to be Temp. 2nd Lieut. (on prob.):—R. W. A. Bridgen, S. A. Camp, C. Fardwell, J. Cartwright, J. D. Coates, A. B. Corey, W. E. Cotton, D. Davies, C. A. Daniel, R. G. De Little, E. Drummond, H. J. Evans, W. Ferrier, S. G. Fidoe, F. Fletcher, C. K. D. Fraser, J. D. Graham, S. Horne, H. Preston, J. R. S. Cox, J. Ferguson, F. W. Foster, T. A. Hopkinson, W. Knox, F. G. Laing, L. O. Ludgate, H. McClunan, W. H. Munns, F. Spurr; March 9th. **Supplementary to Regular Corps.**—2nd Lieut. A. J. L. Chrystall to be Lieut.; Jan. 14th.

London Gazette Supplement, April 6th.

The following appointments are made:—
Flying Officers.—Lieut. B. H. Kewley, Manitoba R., Can. Exped. Force; Lieut. W. Partridge, Manitoba R., Can. Exped. Force; Feb. 1st. 2nd Lieut. G. N. Smith, L'pool R. (T.F.), from a Flying Officer (Observer); Feb. 19th, seniority from March 12th, 1917. Temp. 2nd Lieut. R. M. Hughes, attd. W. York R., and to be transf'd. to R.F.C., Gen. List; Feb. 21st. Lieut. C. R. Hall, Quebec R., Can. Exped. Force; Feb. 24th. Temp. 2nd Lieut. (on prob.), Gen. List, and to be confirmed in their rank:—C. H. Clarke, C. N. Hosken, F. Pooley; Dec. 20th, 1917. S. Hirst, H. W. Payne; Feb. 24th.

Equipment Officers, 2nd Class.—The rank of Lieut. L. C. Kemp, R.E. (T.F.), is as now described, and not as in the *Gazette* of Jan. 26th. 3rd Class:—2nd Lieut. J. F. Clark; Sept. 3rd, 1917. And to be transf'd. to R.F.C., Gen. List:—Temp. Lieut. M. W. J. Kelly, attd. York R.; Temp. Lieut. A. C. Jenkins, Midd'x R.; Temp. 2nd Lieut. H. J. Dolan, Midd'x R.; Jan. 24th. Capt. W. V. Churchill-Longman, Glouc. R., S.R., and to be sec'd.; Feb. 13th. Temp. Lieut. J. G. Dyson, attd. R. Berks R., and to be transf'd. to R.F.C., Gen. List; Feb. 20th. Temp. Lieut. F. H. Law, Gen. List, from a Flying Officer (Obs.); Temp. Capt. T. H. McClelland, S. Afr. Labour Corps; March 5th. Temp. 2nd Lieut. (on prob.), Gen. List, and to be confirmed in their rank:—A. J. Morris; Jan. 7th. D. L. Morter, H. D. Torres; Jan. 24th. W. J. Fenton, A. M. Carroll; Jan. 28th. P. C. le G. Starkie; Feb. 13th. F. S. Waincoat; Feb. 26th. A. W. Tipp, J. H. Jennings; March 1st. K. Fraser, J. Anderson, W. E. Arscott, C. J. Aust, E. Barter, H. Berridge, W. G. Blackmore, R. Q. Bamber, J. L. Baring, J. G. Beevers, W. G. T. Blois, W. L. Clark, J. Dow, C. B. Southey, W. R. Tuddenham, L. H. Vernon, A. S. Wellby, H. J. Weston, G. W. Sturman, H. J. Thomas, E. J. Tibbatts, G. F. Tidbury, A. G. Turner, T. Walker, F. C. Weatherley, A. Walters, G. M. Mavrogordato, S. H. Morgan, H. T. See, A. Snell, A. J. Somers, D. Scrimgeour, A. Matthews, P. H. Matthews, H. A. Paton, S. A. Read, H. S. Rogers; March 5th.

General List.—Temp. 2nd Lieut. (Temp. Lieut.) J. Durward, an Equipment Officer, 2nd Class, and to be Temp. Capt., while specially employed; Jan. 22nd. 1st Class Air Mech. C. G. F. Carver, from R.F.C., to be Temp. 2nd Lieut.; March 3rd. The Christian names of Temp. 2nd Lieut. (on prob.) Norman Gelon Bray, are as now described, and not as in the *Gazette* of Jan. 22nd. The appointment of Temp. 2nd Lieut. (on prob.) E. A. Dixon, notified in the *Gazette* of March 4th, is antedated to Dec. 28th, 1917. To be Temp. 2nd Lieut. (on prob.):—J. D. Grant; Jan. 26th. F. R. Beaudry, D. H. Edmiston, D. C. Fairbairn, W. G. Foster, W. W. Gyles, D. C. Henderson, C. E. Hill, V. G. Humphreys, L. St. Jean, J. A. McGill, W. S. Murray, W. O'Neill, E. C. Pickwood, A. M. Rosenbleet, H. J. G. Rudolf, W. A. Rymal, J. F. Slavik, G. R. L. Vezine, F. C. Ward, L. Yerex; Jan. 28th. J. A. Stretton; Jan. 29th. C. R. Abrahams, L. T. Armstrong, R. R. Brown, S. M. Connolly, H. E. Dempsey, W. W. Ferguson, G. M. Gossage, S. Haydis; Feb. 3rd. 1st Class Air Mech. M. V. Benham, from R.F.C.; 2nd Class Air Mech. R. Carr, from R.F.C.; Qmr.-Sergt. W. T. Henry, from R.E.; 1st Class Air Mech. F. A. Holmes, from R.F.C.; Actg. Corpl. W. R. Jenner, from R.F.C.; Sergt. R. Kay, from R.F.C.; 3rd Class Air Mech. G. C. Moore, from R.F.C.; Feb. 27th. L. D. Abecasis; March 1st. Sgt. C. A. S. Britenden, from R.F.C.; March 11th. G. O. Macdonald (late Lieut., Canadian Exped. Force), E. R. Wood, Pte. H. T. Hamblin, from A.S.C.; March 12th. H. G. Mackay; March 14th. Staff Sgt.-Maj. J. J. Honan, from A.S.C.; March 17th. M. Bateson, P. F. T. Luckham, Staff Sgt. H. M. Drabble, from R.E.; H. H. Smith, Sgt. G. R. Gibbons, from R.W. Surr R., Temp. Sgt.-Maj. C. E. Haines, from R.F.C.; March 18th. Corpl. (Actg. Sergt.) C. H. Badderly, from R.F.C.; March 20th. D. A. Fowler; March 22nd. A. E. Gooch (late Lieut., E. Afr. Exped. Force), Sgt. R. Guy, from R.F.C., 1st Class Air Mech. (actg. Sgt.) J. F. Herd, from R.F.C.; March 24th. Cadets to be Temp. 2nd Lieut. (on prob.):—P. W. Adams, from Lond. R. (T.F.); J. M. Dickinson, from Canadian Eng.; H. N. Davis, from R.F.C.; J. H. Nickson, from R.F.C.; R. W. Paulger, from R.E.; H. S. Wills, from R.E.; March 18th. R. W. B. March, from R.F.C.; March 24th.

London Gazette Supplement, April 8th.

The following appointments are made:—
Staff Captain.—Temp. Lieut. (Temp. Capt.) P. C. Hoyland, Gen. List, from an Adjut., and to retain the rank of Temp. Capt. while so emp'd; March 6th.
Wing Commander.—Major A. S. W. Dore, D.S.O., Worc. R. (T.F.), from a Sqdn. Comdr., and to be Temp. Lieut.-Col. while so employed; March 12th.
Squadron Commander.—Capt. C. H. Gardner, R.F.A. (T.F.), from a Flight Comdr., and to be Temp. Major while so employed; March 11th.

Flight Commanders.—From Flying Officers:—Capt. W. J. Cairnes, Leins. R., S.R.; Feb. 1st. And to be Temp. Capt. while so employed:—Temp. 2nd Lieut. R. P. Fenn, Gen. List; Feb. 22nd. 2nd Lieut. H. J. Whittingham, S.R.; March 11th. Temp. Lieut. G. C. Cuthbertson, Gen. List; March 12th. Temp. 2nd Lieut. J. E. Wight, Gen. List; March 13th. Temp. 2nd Lieut. R. R. Bentley, M.C., Gen. List; March 16th. Temp. 2nd Lieut. G. McPherson, Gen. List; Temp. 2nd Lieut. T. Colville-Jones, Gen. List; March 17th.

Flying Officers.—Temp. 2nd Lieut. P. Wilson, Gen. List; March 27th, 1917 (substituted for the notification in the *Gazette* of April 19th, 1917). Temp. 2nd Lieut. (on prob.) P. Wilson, Gen. List, and to be confirmed in his rank; June 29th, 1917 (substituted for the notification in the *Gazette* of July 21st, 1917). Lieut. J. J. Boyd-Harvey, Yeo. (T.F.), from a Flying Officer (Obs.), seniority from Dec. 6th, 1916. Temp. Lieut. J. L. Bernard, M.G. Corps, and to be transf'd. to R.F.C. Gen. List; 2nd Lieut. (Temp. Lieut.) E. H. P. Jolly, Ind. Army Res. of Of., from a Flying Offr. (Obs.), seniority from Dec. 28th, 1916; Jan. 24th. Temp. Capt. T. E. Laing, A.S.C., and to be transf'd. to R.F.C. Gen. List; Jan.

26th. Lieut. W. J. Brown, Yeo. (T.F.), and to be sec'd.; Lieut. A. M. Hepworth, M.C., R.W. Surr. R. (T.F.), and to be sec'd.; Lieut. M. J. Nicol, Manitoba R., Canadian Exped. Force; Jan. 28th. 2nd Lieut. C. Ayling, Middx. R. (T.F.), and to be sec'd.; Temp. 2nd Lieut. G. M. Sturgess, attd. Essex R., and to be transfd. to R.F.C. Gen. List; Temp. Lieut. (act ng Capt.) W. A. Slocock, R.A., to relinquish his acting rank and to be transfd. to R.F.C. Gen. List; Temp. Lieut. H. W. Lucas, M.C., Gen. List; Temp. 2nd Lieut. R. A. Markwick, Wilts R., and to be transfd. to R.F.C. Gen. List; Jan. 30th. 2nd Lieut. E. O. Lord, S.R.; Feb. 23rd. Lieut. H. A. Bird, Bedf. R., S.R., and to be sec'd.; Feb. 24th. From Flying Offrs. (Ob.).—Capt. A. E. Pickering, M.C., W. Ontario R., Canadian Exped. Force, seniority from March 7th, 1917; Temp. Lieut. H. V. Northam, Gen. List, seniority from Aug. 13th, 1916. Lieut. L. Murphy, M.C., R. Ir. R., seniority from March 26th, 1917. 2nd Lieut. R. E. Butler, Conn. Rang., S.R., seniority from April 21st, 1917. Temp. 2nd Lieut. J. R. Smith, Gen. List, seniority from Nov. 25th, 1916; Feb. 25th. Lieut. B. W. Fryer, Canadian F.A., seniority from April 28th, 1917; Lieut. G. S. M. Gauld, M.C., R.F.A., S.R., seniority from May 25th, 1917; Feb. 27th. Temp. 2nd Lieut. C. Knight, R. Berks. R., and to be transfd. to R.F.C. Gen. List; Feb. 28th. Lieut. E. Steele, M.C., Manch. R. (T.F.), and to be sec'd.; Temp. 2nd Lieut. A. E. Ward, A.C.C., and to be transfd. to R.F.C. Gen. List; March 1st. Lieut. W. Wright, Alberta R., Canadian Exped. Force; March 2nd. Temp. 2nd Lieut. A. Bottoms, attd. Middx. R., and to be transfd. to R.F.C. Gen. List; March 4th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank;—A. E. Ryan; Nov. 4th, 1917. A. J. J. Battel; Dec. 12th, 1917. A. W. Mauby; Dec. 14th, 1917. A. B. Ferguson, F. W. McCarthy, J. C. Stockman; Dec. 17th, 1917. C. H. Andrews, R. P. Darrell; Dec. 18th, 1917. S. C. Leware; Dec. 19th, 1917. H. D. McKay, W. J. C. Smith, J. L. Wray; Dec. 20th, 1917. F. James, E. E. Ballough; Dec. 21st, 1917. J. T. Hall; Dec. 22nd, 1917. L. W. Kinzer, H. A. Laurie; Dec. 24th, 1917. C. G. Coleridge; Dec. 26th, 1917. F. J. Delamain; Jan. 8th. J. A. F. Burwash, W. E. Coventry; Jan. 9th. E. A. Dixon; Jan. 10th. C. E. Kelly, A. L. McKay; Jan. 12th. P. T. Hubbard; Jan. 16th. G. E. Johnson; Jan. 21st. T. B. Randall; Jan. 22nd. J. G. Gore; Jan. 24th. R. S. Martin, A. Connon; Jan. 25th. R. Morrogh, H. A. Kullberg; Jan. 27th. A. Hayland, E. B. Robinson, S. N. Menzies; Jan. 28th. D. F. Gibbons, W. Urinowski; Jan. 29th. F. A. Whitfield, G. D. Longfellow, L. Wycherley, H. C. Wiggins; Jan. 30th. J. D. Grant; Jan. 31st. H. C. Hayes; Feb. 1st. J. G. Hunter; Feb. 19th. H. L. Taylor, W. McIntosh; Feb. 24th. D. P. McIntyre, B. A. Butt, L. T. Lewis, C. F. R. Price-Hughes; Feb. 25th. J. C. MacLennan, G. F. Lane; Feb. 26th. W. S. Walker, E. S. Smithy, F. E. Robinson, C. T. Bremickar, G. H. Allison, J. S. Snedden, J. Stuart, S. Bowden; Feb. 27th. J. E. W. Sugden, H. A. Clarke, H. M. Dickinson, J. A. Parkinson, H. J. Goulding, W. T. Fothergill, J. B. Taylor, W. W. Tebbutt, F. R. Hockney, J. S. Tarbolton, R. B. Thompson; Feb. 28th. S. H. Warner, F. Noble; March 1st. R. A. Slipper, C. E. Mitchell; March 2nd. I. C. G. Simpson, J. H. Paton, H. A. Rudge; March 3rd. D. F. H. Brickell, G. K. Chadwick, J. J. Ince, F. Gifford; March 4th. F. Tattersall, F. J. Sanders, J. C. Wilson; March 5th. The appointment of Temp. 2nd Lieut. C. W. Rivers, Gen. List, is antedated to Dec. 31st, 1917. The surname of Temp. 2nd Lieut. E. N. MacDonald is as now described, and not as in the Gazette of Feb. 26th.

Flying Officers (Observers).—Lieut. R. W. Fenton, Canadian A.S.C.; Feb. 20th, seniority from Oct. 19th, 1917. Feb. 28th, seniority from Oct. 23rd, 1917. Lieut. D. G. Shand, W. York. R. (T.F.), and to be sec'd.; Temp. 2nd Lieut. E. E. Lockwood, K.R. Rif. C., and to be transfd. to R.F.C. Gen. List; Lieut. W. G. Fluke, D.S.O., S. Staff. R., seniority from Nov. 27th, 1917, and to be sec'd.; Lieut. L. F. Short, Yorks. L.I. (T.F.), seniority Dec. 5th, 1917, and to be sec'd.; Feb. 26th. Temp. 2nd Lieut. D. F. Hurr, M.C., attd. Middx. R., and to be transfd. to R.F.C. Gen. List; Feb. 16th, seniority Dec. 15th, 1917. Lieut. F. E. Lefevre, M.C., Linc. R. (T.F.), and to be sec'd.; Jan. 23rd, seniority Dec. 29th, 1917. Capt. D. A. Sutcliffe, W. Rid. R. (T.F.), and to be sec'd.; Jan. 27th, seniority Dec. 31st, 1917. Lieut. T. Nicholson, Durh. L.I. (T.F.), and to be sec'd.; Feb. 15th, seniority Jan. 4th. Lieut. C. J. I. Griffith, M.C., R.F.A., S.R.; Feb. 28th, seniority Jan. 29th. 2nd Lieut. W. R. Gillespie, Bord. R., S.R., and to be sec'd.; March 5th, seniority Nov. 21st, 1917. Temp. 2nd Lieut. H. H. Jones, E. York. R., seniority Dec. 5th, 1917, and to be transfd. to R.F.C., Gen. List; Lieut. B. Burr, Linc. R. (T.F.), seniority Dec. 7th, 1917, and to be sec'd.; March 4th. Lieut. L. Patterson, M.C., R.A., and to be sec'd.; Feb. 27th, seniority Dec. 24th, 1917. Lieut. D. W. Orr, Wilts R., S.R., and to be sec'd.; March 5th, seniority Dec. 29th, 1917; Lieut. J. L. Bell, R.F.A., S.R.; March 4th, seniority Dec. 30th, 1917. Lieut. E. C. Batchelor, R.F.A. (T.F.), seniority Dec. 31st, 1917, and to be sec'd.; Lieut. H. J. Whiting, M.C., R.A., seniority Jan. 3rd, and to be sec'd.; March 5th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank;—A. W. Palmer; Dec. 6th, 1917, seniority Oct. 24th, 1917. R. B. Lane; Feb. 28th, seniority Nov. 11th, 1917. G. W. Hockey; Feb. 15th, seniority Nov. 15th, 1917. A. C. Saunders; Feb. 26th, seniority Jan. 3rd. S. Mack. Sproat; Feb. 28th, seniority Jan. 12th.

Assistant Instructor in Gunnery (graded as an Equipment Officer, 3rd Class).—2nd Lieut. H. J. C. White; Oct. 11th, 1917.

Equipment Officers, 1st Class.—2nd Lieut. (Temp. Lieut.) S. L. Amor, S.R., from the 2nd Cl., and to be Temp. Capt. while so employed; March 6th. 2nd Cl.—Temp. Lieut. A. W. Smith, Gen. List, from a special appointment (graded as an Equipment Officer, 2nd Cl.); March 6th. 3rd Cl.—Lieut. J. London, R. Muns. Fus., S.R., from attd. Labour Corps; March 5th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank;—F. A. Bracher, W. B. Francis, F. M. Hewett, C. Gruchy, A. A. Longworth, E. I. T. Duffield, R. W. Johnson, W. H. O. Jones, W. J. King, T. L. Lewis, W. H. Lowther; March 5th.

Schools of Instruction—School of Technical Training.

Company Commander (graded as an Equipment Officer, 2nd Class).—Temp. Lieut. H. R. Gregg, E. Surr. R., to be Temp. Capt. (without the pay or allowances of that rank) while so employed, and to be transferred to R.F.C. Gen. List; Feb. 4th.

General List.—Qrmer. and Hon. Capt. O. C. Purnell, from R.A.M.C. (T.F.), to be Temp. Capt.; March 4th. Temp. 2nd Lieuts. to be Temp. Lieuts. :—(Temp. Capt.) F. J. Wood, (Temp. Lieut.) L. V. Marchant, H. F. W. Bailey, H. F. Fuller, L. L. Lelen; July 1st, 1917. E. T. Turner; Oct. 9th, 1917. V. St. B. Collins; Dec. 10th, 1917. J. A. Craig; Jan. 7th. (Temp. Capt.) H. H. Maddocks, M.C., C. J. Howson, F. J. Colishaw, V. W. Allen, H. H. T. Potter; Feb. 5th. G. H. S. Cregeen, D. S. C. Newton; Feb. 8th. A. J. Arkell; Feb. 12th. C. F. Jex; Feb. 14th. N. Bark; Feb. 15th. G. M. J. Denman, C. H. P. Ewbank; Feb. 28th. F. J. K. Mason; March 1st. C. H. Blakeway; March 3rd. W. M. Edwards, C. B. Fenton, G. W. P. Davidson; March 4th. S. G. Knock, A. B. Bullock, L. Cable (Temp. Capt.) H. R. Child, R. G. Clough, E. H. Eldridge, W. R. Balden, E. Brewer, L. S. R. Poole, N. E. Maitland; March 5th. R. Clowes, G. K. Cathles; March 9th. F. W. Foat (Temp. Lieut.) N. H. Knock; March 10th. (Temp. Capt.) J. S. Curtis, E. T. Driver; March 11th. A. H. Gabeldu, H. B. Mann, (Temp. Capt.) J. Michie, M.C., A. B. Cort; March 15th. B. O. Angell; March 18th. Sub-Lieut. W. T. Simpson, from R.N.V.R., to be Temp. Lieut.; March 4th. To be Temp. 2nd Lieuts. :—Cpl. L. J. P. Green, from R.E.; Dec. 28th, 1917. Cpl. A. Morgan, from R.F.C.; Dec. 31st, 1917. Sgt. J. Drew, from R.F.C.; Jan. 7th. To be Temp. 2nd Lieuts. (on prob.) :—B. V. Wilson, H. V. P. Lewis; Jan. 23rd. V. Z. Stone, R. T. W. Hill; Jan. 25th. E. Frost, F. F. Norris; Feb. 7th. R. J. Stone; Feb. 8th. A. W. Cameron; Feb. 9th. T. A. Akin, A. B. Agnew, E. W. Anderson, H. Bennett, J. L. Boyd, A. Buckle, J. H. R. Bryant, F. E. Des Brisay, G. C. Carr-Harris, E. O. Champagne, A. S. Compton, A. R. Delay, H. J. Ewan, B. C. Fox, F. C. Hilbert, W. E. Jackson, D. D. McAlpin, J. B. O'Neill, H. A. O'Donnell, B. S. Philip, W. R. Penny, F. R. Pemberton, W. G. Pearce, E. G. Plum, R. C. Pattullo, J. Y. Remnitz, R. A. Ritchie, J. Symington, T. Stead, W. R. H. Standing, C. H. Seffery, N. M. Smith, C. G. V. Smith, B. Sleightholm, W. St. C. Slater, L. L. Saunders, F. A. Samuelson, E. Taviner, H. C. Teller, R. T. Thacker, E. H. Weatherall, W. G. White, S. H. Whipple, W. W. Williams, C. S. Bolsby, W. J. Courtenay, B. Dixon, J. H. Farnham, M. Fearman, H. S. Fey, G. G. Fonseca, H. G. Fraser, F. L. Gall, W. E. Huxtable, T. L. Jones, L. Kinet, J. M. MacDonald, T. F. McGuire, F. A. McHugh, V. B. McIntosh, C. McLean, L. F. Marshall, R. G. Martin, W. C. Mead, F. W. Mesinger, O. O. Mousley, C. R. Campbell; Feb. 10th. Private A. H. Opie, from A.S.C.; March 26th. Cds. to be Temp. 2nd Lieuts. (on prob.) :—V. V. Anderson, A. G. Boardman, E. C. Bethell, D. R. Bradley, W. H. E. Burton, C. H. A. Collins, L. G. Cocking, R. M. Doyle, H. S. Dudson, G. M. Gray, N. F. Hirst, T. P. T. Jones, P. Kemp, R. H. Kemp, H. Knowles, J. I. Laing, J. McDonald, J. Millar, T. F. L. Myring, D. K. Moore, F. D. Marshall, E. M. Nicholas, C. H. Pares, G. B. Pike, H. Pritchett, J. G. Quinton, A. Roche, T. E. Read, R. Simpson, A. Sommerfelt, R. J. Smither, W. C. Snowden, W. Smith, R. J. S. F. Sparks, C. W. Tuck, J. Tulloch, C. C. Walsley, E. Wallace, H. L. Wilson, G. Williams, A. P. Williams; March 14th. To be Temp. Cpts. (with pay and allowances as Lieut.) while acting as Adjts. : Lieut. J. H. Clive, Lond. R. (T.F.); Lieut. E. R. W. Close, Notts. and Derby R. (T.F.); 2nd Lieut. D. I. V. Gatty, R.G.A., S.R.; Feb. 9th. Temp. Lieut. F. R. Bush, attd. Rif. Brig.; Feb. 19th.

Memorandum.—2nd Lieut. (Temp. Capt.) L. Auker to be Lieut. while serving with R.F.C.; Jan. 1st.

General List (R.F.C.).—Cadet A. J. H. Thornton to be Temp. 2nd Lieut. (on prob.); Oct. 1st, 1917 (substituted for Gazette notification Oct. 26th, 1917, page 11024, describing name as A. Thornton).

Aeronautical Inspection Department.

London Gazette Supplement, April 4th.

Temp. 2nd Lieut. A. Mathews, R.F.C., to be Temp. Lieut. (without Army Pay and Allowances) while employed as Assistant Inspector, Aeronautical Inspection Department; Feb. 4th.

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

General Headquarters, April 2nd.

"On the 1st instant several long-distance reconnaissances and photographic flights were carried out by our aeroplanes. Good visibility enabled much work to be done in conjunction with the artillery, and many hostile batteries were engaged by our guns with observation from the air. Our low-flying aeroplanes were again active. Over 17 tons of bombs were dropped, and thousands of rounds of ammunition were fired from the air at the enemy's infantry and other targets on the ground. Hostile aircraft were also active on the southern portion of our front, some of their two-seater machines firing at our troops with machine-guns from a low height. Ten hostile aeroplanes were brought down and six others were driven down out of control. Another German machine was brought down in our lines by our infantry, and two hostile balloons were destroyed by our aeroplanes. Eleven of our machines are missing."

"After dark, our night-flying machines bombed the enemy's railway stations, billets, troops, and transport, dropping many tons of bombs on Cambrai railway station, on a station south-east of Douai, and on the railway line south of that town, as well as on other targets. All our machines returned."

General Headquarters, April 3rd.

"On the 2nd inst., although the weather was fine in the areas behind the front, a heavy bank of low clouds hung over the lines and made reconnaissance work difficult. The enemy's movements on the battle front were watched, however, by low-flying machines, and observation was carried out for the artillery. Hostile troops and transport on the roads were again harassed with bombs and machine-gun fire, over 1,000 bombs being dropped during the day. The enemy's aeroplanes were fairly active between Albert and Moreuil. Thirteen German machines were brought down and eight driven down out of control. Three hostile balloons were also destroyed. Seven of our machines are missing."

"At night rain fell continuously until 3 a.m., after which hour 4½ tons of bombs were dropped on hostile billets and troops, our aeroplanes returning to their aerodromes just as dawn was breaking. During the last fortnight of intense fighting in the air, the assistance rendered by the personnel of the American Air Service attached to the Royal Air Force has been invaluable."

General Headquarters, April 4th.

"The weather on the 3rd inst. was again unfavourable for flying, but this did not prevent our aeroplanes from making several flights to reconnoitre the battle front and to attack ground targets with bombs and machine gun fire. One fight took place during a clear interval between two very large formations of our own and the enemy's machines. Otherwise hostile aircraft were not very active. Nine German machines were brought down and three others driven down out of control. One hostile balloon was also destroyed. Five of our aeroplanes are missing."

General Headquarters, April 5th.

"On the 4th inst. rain and mist greatly interfered with operations in the air. Our aeroplanes, none the less, reported the progress of the battle south of the Somme and fired into the enemy's troops. Of the German machines which appeared on this part of the battle front six were brought down by our aeroplanes and one was shot down by our anti-aircraft gunfire. One of our machines is missing. Two of our aeroplanes which were reported missing in the communiqué of the last two days have since returned to their squadrons."

"About midday on the 5th inst. our aeroplanes dropped 22 heavy bombs on the railway station at Luxemburg. Many of the bombs were seen to burst on the railway and a very large fire was caused. The anti-aircraft fire encountered was considerable, but all our machines returned."

General Headquarters, April 6th.

"On the 5th inst., with the exception of a few flights on the battle front, no flying took place owing to the weather. One hostile aeroplane was shot down by our infantry."

General Headquarters, April 7th.

"During the morning of the 6th inst., owing to bad weather, there was only slight aerial activity. About noon our machines, which had been watching the enemy's movements in the battle front since dawn, reported a concentration of hostile troops south of the Somme. Large formations of our aeroplanes immediately went out in the rain and dropped over 500 bombs on the enemy's assembled infantry, in addition to firing some 50,000 rounds at them with their

machine guns. In air fighting 13 hostile machines were brought down and 11 others driven down out of control. Two German machines also were shot down by anti-aircraft fire. Sixteen of our machines have not yet been located. Many of these have undoubtedly made forced landings behind our lines owing to the difficulty of finding their aerodromes in the heavy rain. Throughout the present battle the Canadians in the Royal Air Force have done most valuable work."

French.

"On March 31st and April 1st our squadrons dropped 12,000 kilogrammes [about 12 tons] of explosives on the railway lines and cantonments of Ham, Chauny, Noyon, &c. A great fire broke out at the railway station of Chaulnes. Enemy cantonments in the region of Roye were plentifully bombarded with machine-guns from a low altitude. Our chaser planes fought numerous engagements, in the course of which eight German machines were brought down, while two others were destroyed by means of anti-aircraft guns."

"Salonica.—Allied airmen carried out successful bombing raids, notably on Berat [Albania]."

"On April 3rd five enemy aeroplanes were brought down, one of them by our machine-gun fire. In addition a German captive balloon was set on fire by one of our machines. During the night of the 2nd and during the day on the 3rd our bombing machines made numerous raids. Twenty-three thousand kilogrammes of bombs were dropped on enemy cantonments, railway stations, and other establishments. Fires were observed, especially in the railway stations of Laon and St. Quentin."

"It is confirmed that five more enemy aeroplanes were destroyed by our pilots on March 27th, 31st, and April 1st and 2nd."

"On April 6th seven German aeroplanes and two captive balloons were brought down by our pilots. Our bombing machines dropped 5,000 kilogrammes of projectiles on the stations and cantonments on the Roye region."

"Salonica.—Two tons of explosives were dropped by Allied airmen on enemy establishments."

Italian.

"Our aviators set fire to an enemy captive balloon in the vicinity of Valdobiadene, and during the night they bombarded the railways in the Val Lagarina."

"British airmen brought down three enemy machines above Cismone; a fourth was compelled to land near Strigno."

"Our airmen set fire to an enemy captive balloon in the vicinity of Valdobiadene. During the night they bombarded the railways in the Val Lagarina."

German.

"Yesterday 22 enemy aeroplanes and five captive balloons were shot down. Lieut. Kroll won his 23rd aerial victory. By the energetic carrying out of long-distance observation from the coast as far as south of the Somme, Aerial Detachment No. 3, under the command of 1st Lieut. Fricke, rendered extraordinary service."

"Cavalry Capt. Baron von Richthofen won his 75th aerial victory."

"In aerial battle 18 enemy aeroplanes were yesterday shot down. Captain Baron von Richthofen gained his 76th, and Lieutenant Udet his 24th, aerial victory."

"Cavalry Capt. Baron von Richthofen achieved his 77th and 78th aerial victories."

"As reprisals for the attacks carried out on March 25th by enemy aeroplanes against the open town of Esine, nine aeroplanes bombed, during the night of April 1st-2nd, the port establishments in the island of Tenedos."

Bulgarian.

"In the Tchernia bend a French aeroplane was brought down in an air fight and fell behind the Bulgarian lines."

SIDE-WINDS.

ANOTHER example of the wonderful efficiency of Triplex Safety Glass was afforded by a smash which occurred to a school machine, and to which reference is made in the Triplex announcement elsewhere in this issue. From a height of 15,000 feet the machine crashed down with such force that the screw end was buried in the ground, and had to be dug out. Yet the windscreen, although it was badly "starred" by the force of the impact, retained its shape.

ANTICIPATING an extended trade in countries in which the metric system is used, the British Aluminium Co., Ltd., has prepared a metric edition of "Aluminium; Facts and Figures." Additional data on various forms of aluminium have been incorporated, and the "Hints on the Working of Aluminium" has undergone amplification. The loose-leaf principle has been adhered to, to allow of the addition or substitution of new leaves, as occasion arises.

"MACHINE Shop Accessories" is the title of a useful little booklet published by Messrs. James W. Carr and Co., Ltd., of 35, Queen Victoria Street, London, E.C., and all who have to do with machine shops and their equipment should send for a copy. It contains details of dividing heads, milling centres, milling tables, breast drills, grinding attachments, &c. A little speciality is a sud pump made in gunmetal, with a capacity of 30 gallons per hour, running at 500 revs. per min. At a slight additional charge the pump can be made reversible without changing direction of delivery, and by moving a small handle on the cover the flow can be regulated to suit all requirements, reducing the flow from maximum output to nothing. Vices of all types, die heads, shearing machines, and punches are also listed.

CORRESPONDENCE.

Royal Flying Corps Families' Relief Fund.

[1955] Very soon after the outbreak of the war this fund was started, with the cordial approval of General Sir David Henderson, K.C.B., D.S.O., with the object of giving temporary relief to the widows or other dependants of the N.C.Os. and men of the Royal Flying Corps who might lose their lives on active service; an appeal for contributions was made through the Press and other sources which met with a liberal response.

For some time the fatal casualties were few, and the calls on the fund were consequently small. But now that fighting in the air has become such a prominent feature in the war the fatal casualties are increasing very materially, and the calls for assistance are proportionately great. In consequence of this the fund is getting very low; we, therefore, make this appeal for subscriptions to enable us to carry on our work, as it would be a sad pity if any family really needing our help could not be assisted for lack of funds.

We feel confident that, in consideration of the splendid work which our airmen are doing in all quarters, we shall not appeal in vain.

The fund is registered under the War Charities Act, 1918. Donations may be sent to the Hon. Treasurer of the Fund, at the Aerial League's Offices, 46, Dover Street, Piccadilly, London, W.1. Cheques to be crossed "A/C of R.F.C. Families' Relief Fund."

H. T. ARBUTHNOT, Major-General,
Chairman and Hon. Treasurer.

46, Dover Street, Piccadilly, W. 1, April 2nd, 1918.

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AERONAUTICAL ENGINEERING CO., LTD.—Capital £20,000 in £1 shares. Electrical, general and mechanical engineers, manufacturers and dealers in aeroplanes, aeroplane engines, parts and accessories, &c.

ALWIN ENGINEERING CO., LTD.—Capital £1,000, in £1 shares. Acquiring business of an aviation and general engineer, &c., carried on at 8, Luther Road, Teddington, as the Alwin Engineering Co. First directors: A. E. Cartledge and E. Griffin.

BRENTFORD AIRCRAFT, LTD., Market Place, Brentford, Middlesex.—Capital £10,000, in £1 shares. Under agreement with J. Gourlay.

FLIGHTCRAFT, LTD.—Capital £5,000, in £1 shares. Engineers, manufacturers of and dealers in aeroplanes, airships and balloons, &c. First directors:—F. A. Coulson, G. J. Axten, W. G. Fearn and J. S. Lockwood.

Aeronautical Patents Published.

Applied for in 1916.

The numbers in brackets are those under which the Specifications will be printed and abridged, &c.

Published April 11th, 1918.

14,206 R. A. EMMONS. Aeroplanes. (113,979.)
18,566 C. M. B. VAN DEN BELD. Sighting-devices for anti-aircraft guns. (103,646.)

Applied for in 1917.

The numbers in brackets are those under which the Specifications will be printed and abridged, &c.

Published April 11th, 1918.

5,287 T. T. LOWES. Aeroplanes. (114,057.)

If you require anything pertaining to aviation, study "FLIGHT's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xlviii, xlix, and l).

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